Returns to Social Network Capital Among Traders

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Abstract[1]

Using data on agricultural traders in Madagascar, this paper shows that social capital has a large effect on efficiency. 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 entrepreneur characteristics. The analysis indicates that three dimensions of social network capital should be distinguished: relationships with other traders, which help firms economize on transactions costs; relationships with individuals who can help in times 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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Social sciences have long recognized the role that social capital play in facilitating human interaction (e.g., Coleman (1988), Putnam, Leonardi and Nanetti (1993), Granovetter (1985)). Unlike human capital, however, which now is seen as a fundamental dimension of most economic processes, the concept of social capital has yet been little used in economics (e.g., Narayan and Pritchett (1996), Barr (1997, 1998), Fafchamps (1998), Fafchamps and Lund (1998)) and is still regarded with suspicion by many. This paper contributes to the debate by providing evidence that social capital has a large significant effect on the performance of economic agents beyond those of physical and human capital. We demonstrate that certain types of social networks are more valuable than others and we throw some much needed light on the possible channels through which social capital affects economic efficiency.

One of the reasons why economists are weary of using the term social capital is that its meaning is imprecise. From an economist's point of view, there are at least two meanings of the phrase that must be clearly distinguished. The first meaning sees social capital as a 'stock' of trust and an emotional attachment to a group or society at large that facilitate the provision of public goods. Examples of this definition of social capital can be found in the works of Coleman (1988) and Putnam, Leonardi and Nanetti (1993): Coleman (1988) argues that kids perform better in school when parents get involved running the school; Putnam, Leonardi and Nanetti (1993) argue that historical differences in levels of trust between individuals account for the diverging economic experiences of northern and southern Italy because it affected firms' ability to contract with each other. Greif (1994) makes a related point with respect to medieval traders on both sides of the Mediteranean. Further examples can be found in the works of Platteau (1994), Gambetta (1988), Fukuyama (1995), and others.

A second meaning sees social capital as an individual asset that benefits a single individual or firm; this meaning is sometimes referred to as social network capital to emphasize that agents derive benefits from knowing others with whom they form networks of interconnected agents. Labor economists and sociologists, for instance, have long recognized that knowing potential employers helps people find a job and that referral plays a key role in the way job markets operate (e.g., Montgomery (1991), Granovetter (1995)). The importance of long term relationships has also been emphasized in the industrial organization literature as facilitating credit, sub-contracting, just-in-time inventory systems, and the like (e.g., Lorenz (1988), Aoki (1984)).

The two meanings of social capital are, of course, connected. Kranton (1996), for instance, demonstrates how a decentralized network of pairwise interactions can help agents economize on search costs, thereby providing an economic efficiency gain to the group. Drawing upon the work of Ghosh and Ray (1996), Fafchamps (1998) shows that, by sharing information on bad payers in a decentralized manner, agents can economize on screening costs. Groups that share information more efficiently are better able to enforce contracts and thus to adapt, expand, and overtake others (e.g., Fafchamps (1998)). This work and that of others (e.g., Platteau (1994), Tadelis (1998)) illustrate how individuals pursuing their self interest by forming relationships with others -- the second meaning of social capital -- may lead to equilibria in which agents expect others to behave in a trustworthy manner -- the first meaning of social capital.

Understanding the role that social capital plays in market exchange is not just a playtoy for theorists, it is also crucial for policy, particularly for the design of institutions that support markets. Market liberalization has been the motto of the 1980's and 1990's in developed as well as developing countries, but the free markets that have

spontaneously emerged everywhere as a result too often resemble flea markets: babouch-kas selling their wares on the sidewalks of Moscow; informal markets clogging the arteries of Third World cities; and wealthy grain traders straight out of Arabian Nights. These forms of market exchange may be picturesque, they are seldom efficient as they duplicate tasks, add to search costs, and maximize labor costs. The lack of sophistication and high level of redundancy of private markets are unlikely to impress governments that, historically, have intervened whenever they perceived markets to be backward and inefficient. For market liberalization to last, an institutional environment must be provided in which efficient forms of exchange can take place.

To understand what functions this institutional environment must provide, it is useful to examine the role that relationships play in actual markets and the different channels through which they assist market exchange. To this effect, this paper investigates whether social capital affects the performance of agricultural traders in the island of Madagascar. Markets for agricultural food products in Madagascar were progressively liberalized in the 1980's (e.g., Berg (1989), Dorosh and Bernier (1994), Shuttleworth (1989)), leading to massive trader entry (e.g., Barrett (1997)). Using detailed data collected on a sample of traders, this paper investigates whether well connected traders sell more and make larger gross profits than others. Section 1 presents the conceptual framework behind our work and briefly discusses the testing strategy. The data and survey methodology are discussed in Section 2. Returns to social capital are estimated and tested in Section 3. Section 4 investigates the channels through which social capital facilitates exchange and raises traders' efficiency. Conclusions are presented at the end.

Section 1. Concepts and Testing Strategy

Economists normally think of production as depending on a series of resources under the control of the producing firm. These resources typically include physical and human capital as well as the management capabilities of the firm's owner or board of directors. Production efficiency depends on what takes place within the firm: combining factors of production in ways that maximize output; purchasing inputs in proportions to their relative prices; etc. The way in which the firm relates to the market is supposed not to affect production efficiency. When firms buy and sell on perfect markets, this is the correct approach because the relationships that economic agents have with each other are then irrelevant: with full information and perfect enforcement of contracts, agents can change suppliers and clients costlessly in response to minute variations in publicly known prices. Relationships confer no advantage over the market; they have no value.

Ignoring social capital, however, is no longer valid when markets are imperfect. In that case, relationships may convey information that minimize search costs, as in Kranton (1996), or they may facilitate the enforcement of contracts, as in Fafchamps (1998). Thanks to better enforcement of contracts, agents may be able to conduct business in a more efficient manner. Whenever trust is present, agents can lower their guard and economize on transactions costs such as the need to inspect quality before buying or the need to organize payment in cash at the time of delivery. Trust therefore enables agents to place and take order, pay by check, use invoicing, provide trade credit, and offer warranty -- all features of markets that we take for granted but that are often dramatically absent from liberalized markets in poor countries (e.g., Fafchamps (1996, 1997), Fafchamps and Minten (1998)). Trust also makes it easier for agents to renegotiate their contractual obligations when problems arise, thereby providing much needed flexibility

in dealing with external shocks (e.g., Bigsten et al. (1998)). Finally, it facilitates the circulation of reliable information about technology and market opportunities, as well as the blacklisting of unreliable agents (e.g., Barr (1997, 1998), Greif (1993)). To summarize, relationships and social networks can substitute for perfect markets and enable agents to economize on transactions costs even though they may fail to achieve the same level of aggregate efficiency as perfect markets. Social capital should thus be viewed as an imperfect response to the absence of perfect market.

Having clarified the reasons why social capital may affect efficiency, we now discuss how its effect on firm performance can be tested. Consider a firm with physical, human, and social capital denoted K, H, and S, respectively. Let its production function be denoted:

$$Q = F(L, K, H, S) \tag{1}$$

where Q and L stand for output and labor, respectively. If social capital is irrelevant for the firm's performance -- for instance because markets are nearly perfect -- S should have no effect on output once we control for L, K, and H. The effect of S on firm efficiency can thus be tested in the usual way (e.g., Chambers (1988)), that is, by regressing output Q on labor and physical, human, and social capital: if S is shown to have a significant positive effect on Q, this constitutes evidence that firms with more social capital get more return from their labor and physical and human capital. A similar approach is used by Barr (1997).

For the estimation of equation (1) to yield consistent parameter estimates, however, the estimation must be devoid of simultaneity bias. It is possible, for instance, that traders would respond to good market opportunities by raising more working capital and hiring more workers. We deal with this possibility by instrumenting all potentially

endogenous regressors. To further minimize the bias resulting from sales shocks, a measure of location specific sales shocks is included in the regression.

Consistency also rests on the absence of omitted variable bias. If, for instance, more efficient traders are, as a rule, more sociable, then S will capture differences in entrepreneurial quality and the coefficient of S will be biased. The possible correlation between entrepreneurial characteristics and factors of production is a general problem; it is not peculiar to social capital.[2] Provided that entrepreneur characteristics are constant over time, one possible remedy would be to estimate (1) via fixed effects. The difficulty with this approach is that social capital does not vary much over time; a very long panel would be required for its effect on output to be identified. We do not have such data. A feasible alternative is to include variables that capture the entrepreneur's propensity to socialize and accumulate wealth, as well as his capacity to monitor workers. This is the approach we adopt here.

Of course, the fact that better able entrepreneurs accumulate more capital, hire more workers, and have more business contacts does not mean that capital, labor, and networks are not essential for production. On the contrary, good entrepreneurs probably accumulate more business contacts precisely because they realize that their success depends on who they know as much as on what they do. There is, however, a dimension along which social capital differs from physical capital and labor: the latter have a well identified opportunity cost, social capital does not. Consequently, one could argue that rational entrepreneurs are unlikely to overaccumulate capital and labor, since doing so

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[2] To see why, suppose that good entrepreneurs are more thrifty and that, as is usually the case in small and medium firms, retained earnings are the dominant source of funds. In this case, physical capital -- and by extension, all variable inputs -- will be correlated with the error term. A similar story can be told with respect to unobserved supervision capacity and labor.

would subtract from their profits. In contrast, it is conceivable that firms may accumulate contacts beyond what they need if the cost of adding to their network is negligible.[3]

Discussions with respondents suggest that maintaining an extensive and up-to-date network of business contacts is not costless: socialization is time consuming and can even involve out-of-pocket expenses if it involves paying for meals and drinks. But even supposing that socialization were costless, overaccumulation of social capital would only bias the estimated coefficient of social capital towards zero -- just like the accumulation of unnecessary equipment could only bias the estimated coefficient of capital down-wards.[4] 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.

The same reasoning applies even if network capital is an automatic by-product of past trade, akin to experience or learning by doing.[5] In this case, however, another source of potential bias arises: if sales shock are correlated over time, social capital may show up significant simply because it proxies for past shocks. To minimize this bias, we include in equation (1) the firm's past growth in sales as a measure of past idiosyncratic

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[3] The social capital literature in the social sciences has generally emphasized the idea that socialization has benefits that extend beyond its initial purpose. Social capital is then seen as an 'externality' of socialization that facilitates other subsequent exchanges (e.g., Coleman (1988), Putnam, Leonardi and Nanetti (1993)). Although this view is not inconsistent with the approach adopted here, it is not central to our estimation strategy.

[4] Firms may accumulate financial assets and real estate that are not required for their business. One could therefore reasonably argue that such assets -- and the return they generate -- 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 will be underestimated.

[5] Firms may accumulate unnecessary years of experience simply by continuing to operate beyond the point where they have learnt the tricks of the trade. This does not mean that experience is unimportant, but it implies that overaccumulation will reduce the estimated coefficient of experience. To minimize this bias, network variables enter the regression in log form.

shocks.

Perhaps the definitive way of convincing the reader that network capital matters is to show that it is useful for some of the activities of the firm, and to demonstrate that these activities help the firm's output. After all, economist, as a rule, accept the presence of physical capital and labor in the production function not because these variables have tested free of omitted variable bias, but because economists believe that firms cannot produce without capital and labor. This conviction does not derive from econometric evidence but rather from our understanding of how the world works. The same reasoning applies to social capital. Anyone who has tried to make a living from buying and selling knows that survival in business is impossible without contacts.[6] Although this realization has long reached other social sciences, it is not yet widely accepted in economics.

To complete our demonstration that social capital is not 'inessential', we therefore venture to show (1) that social capital helps firm economize on certain transactions costs and (2) that lower transactions costs raise output.[7] To this effect, we investigate several channels C through which social capital may facilitate firms' operations. For the first part of our demonstration, we regress C on S, controlling for other variables susceptive of influencing C: if S has the right sign and is significant, this serves as evidence that social capital plays a role in firms' choice of C. The second part of our demonstration is achieved by expanding equation (1) to include the possible effect of C on output:

$$Q = F(L, \ K, \ H, \ S \, ; C) \tag{2}$$

If C has a beneficial effect on output, this concludes the two-step demonstration that

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[6] This is so true that the client base of a firm has a legally recognized value as part its 'goodwill'.

[7] Note that this is a conservative test: social capital may matter in other ways that this method does not control for. It could, for instance, economize on the manager's time, thereby enabling the owner/manager to devote more time to other activities, such running another business or undertaking household chores.

social capital matters. Equation (2) provide additional information as well. If S affects Q only because it reduces C, including C in the regression should result in a non-significant coefficient for S.[8] If, however, S has an effect on output beyond its effect on C, then both C and S should be significant in equation (2). Having described the testing strategy, we now turn to the data and estimation itself.

Section 2. The Data

A survey of agricultural traders was conducted in Madagascar in a joint project between IFPRI (the International Food Policy Research Institute) and the local Ministry of Scientific Research (FOFIFA). The first round of the survey was held between May 1997 and August 1997 and collected information on the individual characteristics of traders and on the structure, conduct, and performance of the trading sector. A second survey round was conducted between September 1997 and November 1997; it focused on the nature of respondents' relationships with other traders, clients, and suppliers.

The sample design was constructed so as 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, Majunga, and Antananarivo) and the sampling frame within these regions was set up so as to cover traders operating at three different levels:

(1) 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.

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[8] This testing strategy requires that factors other than S affect C, so that S and C are not perfectly multicollinear.

(2) Urban traders located outside the regular markets. These often are bigger traders, processors (e.g., rice millers), and wholesalers.

(3) 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 so as to be representative of 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. The different forms in which these products are marketed were taken into consideration, i.e., paddy and milled rice, maize and maize flour, etc. 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. Other most actively traded products are beans and lentils (18% of the sample report them as their main traded product), cassava (5%), potatoes (5%), peanuts (4%), and maize (2%).

A total number of 850 traders were surveyed in the first round, 739 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.[9] The main characteristics of respondents are summarized in Table 1. Since surveyed firms are traders, total sales are the relevant measure of output. Value added is measured as the gross margin, that is, as the difference between the value of total sales and total purchases; it represents total returns to labor, manage-

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[9] The category of traders which were hardest to trace during the second survey round are those who are least formal and have the least permanent form of operation. As a result, small itinerant traders tend to be underrepresented in the results reported here.

ment, and capital. Value added is our preferred measure of output but, because data on margins are more subject to measurement error,[10] we use total annual sales as an alternative measure of production.[11]

Detailed information is available on working capital and equipment (mostly weighting equipment), storage capacity and vehicles, utilization of telephones and fax machines, labor, management, human capital, and social capital. The data show that the surveyed businesses are fairly unsophisticated by western standards: average working capital is roughly equivalent to 2,000 US dollars -- a large number compared to the annual GDP of Madagascar which was 230 US dollars in 1997, but very small compared to the turnover of grain trading companies in the U.S. or Europe. The great majority of surveyed traders do not have their own transportation equipment, nor do they use fax machines or even telephones very often. Each trading business has an average of four workers, including the owner/manager. Most respondents work full time in trade and remain traders all year round. On average, they are fairly well educated by Madagascar standards. In Madagascar trade is conducted in Malagasy, the national language which is spoken throughout the island. French is commonly used in the administration and in some (primarily urban) secondary schools. Close to half of the respondents commonly speak a language other Malagasy -- mostly French.

Information was collected on various dimensions of the respondents' social net-

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[10] 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.

[11] By definition, what traders produce is an intermediation service which is best measured by their total sales. Inventories are minimal among surveyed traders and certainly do not extend from one year to the next (e.g., IFPRI (1998)). Using annual sales and value added should thus be largely free of inventory bias.

work: the number of close relatives in agricultural trade; the number of (non-family) traders that respondents know; the number of friends and family members who can help the business stay afloat in times of trouble; and the number of suppliers and clients that respondents know personally. These different dimensions of social capital are correlated, but only imperfectly so. This should enable us to ascertain whether certain dimensions are more important than others. We also observe little or no direct correlation between measures of social network capital and firm size. The coefficient of correlation between annual sales and known traders, for instance is 0.05; it is 0.02 with family traders. The number of known traders is thus not a direct function of sales: small traders may know many others like themselves. Similarly, there is no noticeable correlation between total sales and the number of clients and suppliers known personally by the trader -- 0.08 and 0.03, respectively -- the reason being that much trade takes place at arms length among both small and large firms.

Data is also available on the way traders deal with each other. Results show that traders collect price information primarily by talking with other traders (Table 2). The information so collected need not be accurate, however, given that traders have conflicting interest in taking advantage of arbitrage opportunities. A small proportion of respondents prefer to rely on information provided by suppliers and clients. Since the interests of traders and their suppliers and clients are contradictory, this approach is unlikely to yield accurate information unless respondents have a long term relationship that ensures truthfulness. Some traders obtain information from messengers instead, a more costly but probably more accurate method.

On average, surveyed traders buy and sell mostly in cash. Invoicing and the use of checks are virtually unheard of. A small but non-negligible proportion of traders

nevertheless manage to receive and grant trade credit, typically for a very short duration. Since respondents rotate their working capital several times per month, even short term credit can significantly add to their buying capacity. Traders nearly always inspect the quality of the food products they buy; this task is so important that it is virtually always assumed by the owner/manager in person (see Fafchamps and Minten (1998) for details). Surveyed traders do part of their business with regular suppliers and clients, with whom they are more likely to place orders and receive or grant credit and less likely to inspect quality. This conforms with theoretical expectations according to which relationships facilitate search (e.g., Granovetter (1995), Kranton (1996)) and contract enforcement (e.g., Ghosh and Ray (1996), Kranton (1996), Fafchamps (1998)). Now that we have a better sense of what the data look like and where they come from, we turn to the econometric analysis.

Section 3. Returns to Social Network Capital

The functional form used for regression analysis is basically a Cobb-Douglas production function and is estimated in log form. Given the Cobb-Douglas functional form, variables such as social capital that potentially raise the efficiency of labor and capital factor out as a Hicksian neutral multiplicative term, i.e., we have:

$$Q = (g(S) L)^\alpha (h(S) K)^\beta = g(S)^\alpha h(S)^\beta L^\alpha K^\beta = f(S) L^\alpha K^\beta$$

where $g(S)$, $h(s)$, and $f(S)$ are functions that express the effect of social capital S on the efficiency of labor L and capital K. The same applies for human capital, entrepreneur characteristics, and family background. To control for the possibility that family members are more productive than hired workers because of moral hazard considerations, we include the share of family workers in the firm's workforce as additional regres-

sor. Non-essential inputs such as storage capacity are added to the above regression equation as log(storage capacity +1). This avoids losing observations when the respondent has no storage capacity while being consistent with the use of logged sales and gross margins as dependent variables. Social capital variables 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. We also include two measures of shocks: 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.[12] 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.

The estimation of equation (2) by ordinary least squares is presented in the first column of Tables 3 and 4 for value added and total annual sales, respectively. Details about the form in which regressors enter the regression are given in the Tables. Results by and large conform with expectations. Working capital and labor have the expected sign and are highly significant. Traders with a subsidiary are shown to nearly double their sales.[13] Equipment, storage capacity, and telephone use have the expected sign and are often significant. In contrast, ownership of transport vehicles appears to have a negative

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[12] The firm's own sales are omitted from the shock variable to avoid spurious correlation.

[13] Discussions with respondents suggest that the major constraint preventing traders from opening multiple branches is the difficulty to monitor workers and prevent theft and embezzlement (e.g., Fafchamps and Minten (1998)). This issue deserves more research.

effect on sales -- possibly because respondents are engaged in transport as well as trade. Being a part-time trader does not appear to have a noticeable effect on value added and sales, but year-round traders tend to sell more. Contrary to expectations, the presence of family members among the firm's labor force is shown to have a large *negative* effect on sales and value added. Family members thus appear to work less hard than hired workers. One likely explanation is that family members are present in the business more to keep company to the owner than to work.[14]

On the human capital side, schooling and business experience of the owner are shown to raise efficiency, a result in line with other empirical evidence that the returns to human capital in non-farm activities is high (e.g., Newman and Gertler (1994), Jolliffe (1996), Yang (1997), Fafchamps and Quisumbing (1998)). The only surprising result is that traders who commonly speak a language other than Malagasy do less well than those who confine their conversation to the national language. That speaking other languages does not contribute to efficiency in trade is hardly a surprise given that Malagasy is widely spoken throughout the country and is the language of trade. But it should not reduce efficiency. One possible explanation is that those respondents who report speaking French on a regular basis are not fully committed to a career in trade: they hope to get an administrative job in the not-too-distant future and cultivate their French to enhance their chances of getting such a job.[15] Another alternative explanation is that traders who speak several languages have a comparative advantage in other forms of trade, such as import-export. Consequently, they divert part of their attention and effort to other trading activities that are not captured in our measure of sales and value added.

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[14] An alternative explanation is that the owner works less when family members are around.

[15] Thanks to Manfred Zeller for pointing this out.

Moving to the emphasis of this paper, social capital, results show that most forms of networks raise both total sales and gross margins even after controlling for working capital and equipment, labor, human capital, and management. These results are further comforted by a joint *F*-test presented at the bottom of the Table. The two most important dimensions of social capital appear to be the number of traders known and the number of people the respondent can count on in case of trouble. Estimated coefficients indicate that the effect of social capital on output is large: keeping physical and human capital constant, a doubling of the number of known traders raises sales and value added by 20% and 28%, respectively; a doubling of the number of people who could help in times of trouble similarly raises sales and gross margins by 18-27%.

One dimension of social capital -- the number of close relatives in agricultural trade -- appears with the wrong sign and is highly significant. This result is extremely robust -- it arises as soon as sales or gross margins are regressed on labor, working capital, the subsidiary dummy, and the number of relatives in agricultural trade -- but it is difficult to explain. The beginning of an explanation is suggested 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 we control for close interaction with businesses held by relatives.[16] This is consistent with the ideas that respondents who have close relatives in trade have trouble mentally disentangling their business from that of their relatives and, as a result, tend to overreport the working capital and equipment that is truly theirs.[17] An

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[16] E.g., whether main suppliers and clients are relatives, and whether the respondent raised funds from informal sources -- presumably, relatives as well.

[17] It is, for instance, unclear whether respondents make a sharp distinction between relatives working with them and relatives operating a distinct business -- possibly because family helpers also operate on their own account. If this is the case, total reported labor, which includes family helpers, overestimates actual labor effort. This phenomenon might explain why the coefficient of family labor share is negative and significant. By the same token, relatives who are entrusted with part of the working capital of the respondent might rotate that working capital for their own account, a practice commonly described for

alternative explanation is that close relatives burden the respondent's business by tapping into its working capital and by insisting on sharing arbitrage gains. Although at first glance tempting, this explanation is, however, unconvincing after closer examination: just as relatives might burden the respondent's business, the respondent might burden its relatives' business. Consequently, the net effect of having relatives *in agricultural trade* should, on average, be zero. Another possibility is that blurred business boundaries dilute incentives and result in lower unobserved effort. These issues deserve further investigation, but the results reported here certainly suggest 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 (1995a)). If anything, non-family networks are more important than family networks for success in business. This finding is to be compared to Bigsten et al. (1998), who similarly report that family links account for only a minute portion of relationships in African manufacturing.

Before regarding the above conclusions as definite, we must first verify the robustness of our results. OLS estimates may be biased due to simultaneity bias between sales, labor, and working capital: if sales are high, traders may raise additional working capital and bring in additional workers. Telephone utilization might also go up as a result of high activity. By the same token, the share of family labor might increase if traders resort on family members as supplementary labor during peaks (e.g., Fafchamps (1994)). To correct for the possibility of such a bias, we reestimate the model using instrumental variables (column IV1 in Tables 3 and 4).

We have at our disposal an unusually rich set of instruments which is detailed in

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agents of Chartered Companies in pre-industrial Africa (e.g., Braudel (1986)).

Appendix. Instruments includes a wide range of variables capturing the entrepreneur's family background, business start-up experience, personal wealth and financial assets, access to telecommunication equipment, history of solidarity, market competition, as well as various perception and expectations variables. These variables control for access to capital (family background, business experience, personal wealth, and history of solidarity), access to labor (market competition, family background), and access to a telephone (telecommunication equipment). Perception variables are added to control for personal traits of the respondent that might affect his or her willingness to raise additional funds or hire extra workers, either from the family or from elsewhere. Estimation results are presented in the second column of Tables 3 and 4. They are not dramatically different from OLS estimates, except that standard errors rise and the R-squared falls. Qualitative results regarding social capital are, by and large, unaffected.

There remains the possibility that the reported results on social capital are subject to omitted variable bias. The regressions reported in Tables 3 and 4 control for factors of production in great detail, thereby reducing the risk of that social capital variables are significant because they are correlated with an omitted determinant of sales and gross margins. But it is conceivable that social capital is significant because there exist unobserved factors that raise trade efficiency and are correlated with S. To correct for this possible bias, we include additional explanatory variables in the regressions. The first set, entitled entrepreneur's attitude, captures the entrepreneur's propensity to save as well as his or her individualism and altruism. These attitudes were elicited by asking respondents to rank various assertions as true or false (see appendix for details).[18] We expect

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[18] To minimize bias, the assertions were translated in Malagasy and enumerators were instructed to read the assertions aloud.

more thrifty and individualistic entrepreneurs to perform better. More altruistic -- and presumably more sociable -- respondents are also expected to accumulate more business contacts. If social capital is significant because it proxies for entrepreneur's personal traits, then the inclusion of attitude variables should leave social capital coefficients non-significant.

The second set of additional regressors includes characteristics of the entrepreneur's family that could have potentially affected the size of his or her network. For instance, parents who are better educated or have more trade experience may have endowed their children with better business contacts (e.g., Granovetter (1995b)). Entrepreneurs with more adult brothers and sisters are also likely to have more family members in business. The third set of variables includes growth rates in annual sales over the past two years. The idea is that if social capital is but a by-product of past sales, firms that grew rapidly over the last two years should have less social capital. If, in addition, sales shocks are correlated, social capital may proxy for autocorrelated shocks. Including growth in sales should minimize the possibility of such a bias.

Results show that entrepreneurial traits affect firm performance: traders who described themselves as having a high propensity to save are shown to be more productive. Similarly, more individualistic entrepreneurs have higher value added. In contrast, family background does not exert any effect on productivity that is not already captured by other regressors.[19] Past growth in sales is strongly associated with performance, suggesting either that idiosyncratic sales shocks are positively correlated over time. If confirmed by more detailed time-series analysis on panel data, this finding has deep

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[19] The trade experience of parents has a significant effect on annual sales, but with opposite signs.

implications regarding arbitrage and market efficiency: presumably, if competition is fierce, any efficiency advantage should be competed out over time. The presence of long-lasting idiosyncratic shocks suggests otherwise and is consistent with Barrett's (1997) observation that, in spite of massive entry, Madagascar grain markets remain uncompetitive. This issue deserves more investigation.

How does the inclusion of additional variables affect the measured effect of social capital on productivity? Family members in agricultural trade remain a negative influence on firm performance, but the significance of the variable drops below conventional levels of significance in the value added regression. As could have been expected, experimentation with different lists of regressors reveals that the drop in significance is caused by the inclusion of family background variables. The inclusion of entrepreneurial attitude variables is what leads the number of known traders to become non-significant, suggesting that this variable proxies for entrepreneurial talent. Non-family network variables remain jointly significant, but the emphasis shifts entirely to the number of people who can help in difficult circumstances: if anything, the coefficient of this variable gets larger and more significant. These results confirm that, although some of the measured effects of social capital are in fact attributable to entrepreneurial talent, non-family social networks also have a distinct positive influence on firm performance. Of course, there may exist yet other omitted variables that bias our results. Short of obtaining long panel data, however, these effects can probably not be controled for.

In another experiment not shown here, we instrumented social capital variables themselves in an effort to control for possible self-selection bias. The instruments reported in Appendix indeed include various determinants of 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 toward solidarity. Results show that non-family network variables remain jointly significant; the instrumented number of known traders captures most of the beneficial effect of social capital on trader productivity.

Section 4. Social Capital and Modes of Transaction

The results presented in the previous section show that non-family social capital has a strong and robust beneficial effect on trade efficiency. What they do not tell us, however, is where this effects comes from. To this we now turn.

In Section 1 we argued that social network capital might raise efficiency because it reduces transactions costs. Although we do not have direct measures of transactions costs, we have detailed information on the way traders deal with each other. The inspection of quality at each purchase, for instance, is a time consuming activity that is likely to divert the trader's attention from other tasks. Consequently, traders who have established a sufficiently strong relationship of trust with their suppliers may skip quality inspection and reallocate their time to other business. Similar reasoning suggest that traders who can trade with regular suppliers and clients should economize on search costs. By the same token, traders should economize on information collection costs if they can rely on their clients and suppliers for price information or if they can afford to send messengers to collect information. Those who receive credit have more working capital to play with and should, other things being equal, also be more productive and expand their business. Those who give credit to their clients should similarly be better able to attract customers and compete successfully. Finally, those who place orders can better plan and coordinate

their activities.

To examine the effect of social network capital on transaction costs, we begin by regressing modes of transaction on variables susceptible to influence the choice between alternative ways of dealing with clients and suppliers, such as access to telephone, human capital, social capital, and location variables. This analysis should also elucidate which dimensions of social capital are more critical for the use of particular modes of transactions. Results, presented in Table 5, indicate that knowing clients personally helps collecting price information from clients and suppliers directly; it also helps selling more on credit and selling more to regular clients. Similarly, knowing suppliers personally helps purchasing more on credit and buying more from regular suppliers. These results confirm that social capital affects modes of transaction through its effect on relationships and trust (e.g., Fafchamps and Minten (1998)). Respondents who know more traders also tend to rely more on suppliers and clients for price information, and to sell more on credit. Again, the ability to screen clients appears a major determinant of a firm's willingness to grant credit (e.g., Fafchamps (1998)). Schooling is associated with more trustworthy modes of transaction as well: the coefficient of years of schooling is positive and significant in the client credit, regular client and supplier, and quality inspection regressions. These results suggest that better educated traders are more likely to realize the usefulness of more sophisticated ways of transacting, but that they cannot capitalize on this understanding unless they have the necessary social capital.

Having shown that social network capital affects the way in which traders deal with each other, we now investigate whether these modes of transaction explain differences in efficiency across traders. If an effect is found, it can be interpreted as evidence that social capital helps economize on transaction costs. Three sets of regression results are

presented in Tables 6 and 7. The first column presents, as before, straight OLS estimates without any instrumentation. Given that productivity shocks may affect the choice of transaction method, a second set of regression results, labeled IV1, corrects for possible simultaneity bias in working capital, labor, and modes of transaction. Multicollinearity between predicted variables is likely to occur because we do not have good instruments for the propensity of traders to rely on each particular mode of transaction separately from the others. The third set of regressions, labeled IV2, adds past growth in sales as well as entrepreneurial attitude and background.

Estimated OLS coefficients indicate that those traders able to rely on their clients and suppliers to gather reliable information about prices perform significantly better than those who must rely on the information provided by other traders like them. Traders who use messengers to collect price information also do significantly better. In both cases the estimated effect is large and robust: reporting clients and suppliers as the main source of price information is associated with a 60% increase in gross margin. Taken together, these results indicate that access to accurate price information is a key factor in a trader's success. This is hardly surprising, given the importance of spatial and temporal arbitraging in Third World staple food markets (e.g., Jones (1959, 1965), Dercon (1995), Baulch (1997), Ravallion (1986)). They also suggest that better information can be obtained by establishing a good relationship with clients and suppliers (e.g., Fafchamps and Minten (1998)).

Except for the placing of orders, variables associated with more trusting ways of doing business have all the expected sign and many are significant. Traders' ability to sell on credit is shown to be an important determinant of performance; since granting credit to clients is a highly risky proposition (e.g., Fafchamps and Minten (1998)), firms better

able to identify reliable clients appear to be at an advantage, even after controling for working capital, labor, education, and the like. Having regular clients also appears associated with higher sales and gross margins. Not having to inspect the quality of supplies at each purchase is similarly associated with higher sales and margins: given that quality inspection is virtually exclusively undertaken by the owner/manager of the firm (e.g., Fafchamps and Minten (1998)), not having to inspect allows the trader to devote more time to other activities and thus to do more business. Contrary to expectations, we find that firms that place orders with suppliers get significantly lower gross margins. One possible interpretation is that Malagasy traders place orders only when they cannot find ready supplies; this interpretation is consistent with the fact that orders are often fulfilled late (e.g., Fafchamps and Minten (1998)). In this context, placing orders is a sign of weakness and is associated with smaller margins.

The results provide important insights as to the particular role of different dimensions of social capital: once we control for modes of transaction, only those dimension of social capital that raise efficiency in ways other than by facilitating transactions should remain significant. Comparing Tables 3 and 6 and Tables 4 and 7 reveals that the inclusion of modes of transaction variables leads the coefficient of the number of traders known to drop in size and significance. This is quite in line with what one would expect: having relationships with more traders facilitates transactions in ways that are largely captured by the modes of transaction variables. In contrast, the number of people who can help in a financial emergency remains significant even in Tables 6 and 7. This indicates that better insurance raises efficiency in ways other than through the reduction of transactions 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.

This issue deserves more investigation.

The number of close relatives in agricultural trade continues to have a negative and significant coefficient in the OLS regression, thereby suggesting that the negative effect on productivity resulting from having relatives in trade has little to do with transactions costs. This is consistent with our earlier interpretation, namely, that traders who have close relatives in agricultural trade overstate their own resources because they do not adequately distinguish them from those of their relatives.

The next columns of Tables 6 and 7, labeled IV1, gives estimates with instrumented labor, capital, and modes of transaction. Most mode of transactions variables continue to be significant, but some of the social capital variables drop below conventional levels of significance -- together with labor, storage capacity, and equipment. The last columns of Tables 6 and 7 add entrepreneurial and past growth variables. Results are very similar to those reported in the previous column. If anything, the inclusion of these additional variables reinforces the significance of modes of transaction and insurance network.

Taken together, there results confirm that social capital raises traders' efficiency and that part of the efficiency enhancing effect of social capital operates through the reduction of transactions costs. The strength and robustness of social capital variables stands in sharp contrast with the less robust and partly counterintuitive results obtained with human capital variables such as years of schooling, years of experience as a trader, and the ability to speak more than one language. Although this does not imply that human capital is unimportant, it suggests that social capital might be as important if not more for efficiency in economies characterized by high transaction costs and poor market institutions.

Conclusion

There is a growing recognition that relationships play an important role in market exchange, but what this role is and what function relationships play largely remain a mystery. This paper provides a tentative answer to these questions using original data on agricultural traders in Madagascar. We control for simultaneity with a rich set of instruments and minimize omitted variable bias by adding variables that capture the personal characteristics and family background of entrepreneurs. We complement our analysis with an investigation of the channels through which social capital affects firm efficiency.

Results document the strong positive effect that social capital has on the performance of agricultural traders in Madagascar. The evidence suggests that at least three distinct dimensions of social network capital need to be distinguished: relationships with other traders, which help firms economize on transactions costs; relationships with individuals who can help in times of financial difficulties, which insure traders against liquidity risk; and family relationships, which appear to reduce efficiency, possibly because of measurement error. Having family members in trade therefore does not constitute the only, or even the major component of social capital, as is often assumed -- although it may help at start-up (e.g., Fafchamps and Minten (1998)).

We also 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. Trading in this manner is likely to reduce transactions costs, which explains why traders with better relationships have higher margins. Schooling is correlated with the use of superior modes of transaction but needs to be complemented by social network capital to be fully effective.

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Table 1. Dependent Variables and Regressors

A. Dependent variables	Unit	Mean	Std. dev.
Total annual sales of agricultural food products	000 FMg.	196686	510437
Total annual gross margin	000 FMg.	29311	108653
B. Capital and equipment			
Working capital	000 FMg.	10307	38176
Dummy if subsidiary	Yes=1	4.7%	
Value of equipment	000 FMg.	1993	10440
Storage capacity	Metric tons	26	134
Number of vehicles	Number	0.14	0.50
Utilization of telephone	Yes=1	16.2%	
Utilization of fax equipment	Yes=1	0.8%	
C. Labor and management			
Manpower (in months/year)	Month/year	39.5	131.8
Dummy if full time trader	Yes=1	87.3%	
Dummy if trader all year round	Yes=1	83.4%	
Years of schooling of owner/manager	Years	9.1	3.5
Years of experience in agricultural trade	Years	6.0	4.5
Commonly speaks a language other than national language	Yes=1	42.8%	
D. Social capital			
Number of relatives in agric. trade	Number	0.7	1.2
Number of traders known	Number	8.8	9.1
Number of people who can help	Number	2.3	1.7
Number of suppliers known personally	Number	4.6	7.6
Number of clients known personally	Number	8.6	14.2
E. Location			
In capital city	Yes=1	15.7%	
In another city	Yes=1	31.3%	
In Vakinankaratra region	Yes=1	19.9%	
In Fianar/hauts plateaux region	Yes=1	24.9%	
In Fianar/cotes et falaise region	Yes=1	11.5%	
In Majunga/plaines region	Yes=1	12.2%	
In Majunga/plateaux region	Yes=1	13.4%	

Table 2. Modes of Transaction

	Unit	Mean	Std. dev.
Price information obtained from other traders	Yes=1	60.2%	
Price information obtained from clients and suppliers	Yes=1	28.3%	
Price information obtained from messengers	Yes=1	11.5%	
Share of purchases on credit	Share	15.8%	31.9%
Share of sales on credit	Share	13.6%	19.6%
Share of purchases from regular suppliers	Share	38.6%	39.9%
Share of sales from regular clients	Share	26.8%	27.7%
Firm always inspect supplies	Yes=1	84.5%	
Firm's clients always inspect supplies	Yes=1	85.3%	
Firm places orders from suppliers	Yes=1	14.6%	

Table 3. Effect of Social Capital on Value Added

		OLS		IV1		IV2	
		Coef.	*t stat.*	*Coef.*	*t stat.*	*Coef.*	*t stat.*
A. Capital and equipment							
Working capital	log	0.269	**7.109**	0.273	**2.970** (*)	0.324	**3.476** (*)
Dummy if subsidiary	Yes=1	0.982	**3.774**	1.034	**3.639**	1.076	**4.037**
Value of equipment	log	0.007	0.220	-0.053	-1.338	-0.034	-0.898
Storage capacity	log	0.125	**2.217**	0.006	0.068	0.033	0.409
Number of vehicles	log	-0.375	-1.438	-0.693	**-2.223**	-0.570	**-1.879**
Utilization of telephone	Yes=1	0.243	1.400	0.009	0.026 (*)	0.197	0.565 (*)
B. Labor and management							
Manpower (in months/year)	log	0.655	**5.452**	0.970	**3.194** (*)	0.734	**2.368** (*)
% family labor in total labor force	share	-0.458	**-2.022**	-2.202	**-3.847** (*)	-1.166	**-1.964** (*)
Dummy if full time trader	Yes=1	0.056	0.265	-0.051	-0.220	-0.032	-0.148
Dummy if trader all year round	Yes=1	0.205	1.147	0.114	0.518	0.199	0.919
Years of schooling of owner/manager	level	0.036	**1.895**	0.030	1.393	0.019	0.902
Years of experience in agricultural trade	log	0.167	**1.854**	0.101	1.011	0.135	1.404
Speaks another language	Yes=1	-0.291	**-2.094**	-0.240	-1.574	-0.140	-0.969
C. Social capital							
Number of relatives in agric. trade	log	-0.238	**-2.006**	-0.215	**-1.653**	-0.199	-1.527
Number of traders known	log	0.277	**3.272**	0.213	**2.278**	0.130	1.443
Number of people who can help	log	0.182	**1.674**	0.156	1.326	0.222	**1.989**
Number of suppliers known personally	log	0.102	1.328	0.048	0.566	0.108	1.340
Number of clients known personally	log	0.085	1.119	0.038	0.448	0.052	0.649
D. Shocks							
Aggregate sales shock	ratio	0.144	1.316	0.151	1.232	0.094	0.825
Theft in past 12 months	Yes=1	-0.464	**-2.114**	-0.302	-1.248	-0.259	-1.151
E. Location							
In capital city	Yes=1	-0.920	-1.504	-0.651	-0.991	-1.181	**-1.907**
In another city	Yes=1	0.328	**2.231**	0.432	**2.507**	0.374	**2.288**
In Vakinankaratra region	Yes=1	-0.730	-1.189	-0.689	-1.039	-1.031	**-1.659**
In Fianar/hauts plateaux region	Yes=1	-0.802	-1.308	-0.838	-1.265	-1.252	**-2.008**
In Fianar/cotes et falaise region	Yes=1	-0.445	-0.717	-0.493	-0.732	-0.923	-1.455
In Majunga/plaines region	Yes=1	0.134	0.211	0.154	0.224	-0.196	-0.301
In Majunga/plateaux region	Yes=1	-0.152	-0.237	0.080	0.116	-0.312	-0.478
F. Entrepreneur's attitude							
Propensity to invest in business	index					0.123	1.622
Propensity to save	index					0.152	**3.154**
Propensity to spend on durables	index					0.075	1.528
Propensity to spend lavishly	index					0.051	0.589
Individualism	index					0.136	**1.744**
Altruism	index					-0.017	-0.252
G. Entrepreneur's family background							
Father has primary education	Yes=1					-0.218	-1.385
Mother has primary education	Yes=1					0.168	1.022
Father has secondary education	Yes=1					-0.046	-0.243
Mother has secondary education	Yes=1					0.030	0.127
Father's years of trade experience	log					0.084	1.073
Mother's years of trade experience	log					-0.098	-1.269
Number of adult brothers	log					-0.014	-0.116
Number of adult sisters	log					0.017	0.145
H. Past idiosyncratic shocks							
Growth in sales 94-95	rate					0.000	**3.968**
Growth in sales 95-96	rate					0.000	**3.244**
Intercept		3.091	**3.932**	4.420	**3.744**	2.425	**1.989**
Number of observations		632		618		618	
R-squared		0.4981		0.4316		0.5349	
(*) Regarded as endogenous.							
Joint test of non-family social capital		**9.31**	0.0000	**3.31**	0.0107	**3.50**	0.0078

Table 4. Effect of Social Capital on Annual Sales

		OLS		IV1		IV2	
		Coef.	*t stat.*	*Coef.*	*t stat.*	*Coef.*	*t stat.*
A. Capital and equipment							
Working capital	log	0.228	**7.369**	0.259	**3.244** (*)	0.326	**3.938** (*)
Dummy if subsidiary	Yes=1	1.086	**5.246**	1.102	**4.585**	1.112	**4.834**
Value of equipment	log	0.046	1.835	-0.017	-0.536	0.000	0.013
Storage capacity	log	0.154	**3.580**	0.036	0.590	0.014	0.226
Number of vehicles	log	-0.363	**-1.816**	-0.733	**-3.034**	-0.633	**-2.670**
Utilization of telephone	Yes=1	0.292	**2.092**	0.456	1.540 (*)	0.759	**2.540** (*)
B. Labor and management							
Manpower (in months/year)	log	0.536	**5.957**	0.638	**2.622** (*)	0.466	**1.820** (*)
% of family members in total labor force	share	-0.422	**-2.349**	-2.333	**-4.753** (*)	-1.601	**-3.083** (*)
Dummy if full time trader	Yes=1	0.180	1.194	0.060	0.355	0.017	0.103
Dummy if trader all year round	Yes=1	0.363	**2.676**	0.403	**2.355**	0.471	**2.762**
Years of schooling of owner/manager	level	0.030	**1.972**	0.022	1.218	0.011	0.625
Years of experience in agricultural trade	log	0.103	1.426	0.088	1.077	0.133	**1.660**
Speaks another language	Yes=1	-0.240	**-2.152**	-0.268	**-2.109**	-0.172	-1.396
C. Social capital							
Number of relatives in agric. trade	log	-0.252	**-2.672**	-0.226	**-2.124**	-0.191	**-1.751**
Number of traders known	log	0.198	**3.038**	0.153	**2.065**	0.096	1.308
Number of people who can help	log	0.265	**3.097**	0.206	**2.140**	0.278	**2.986**
Number of suppliers known personally	log	0.043	0.705	-0.016	-0.236	0.014	0.201
Number of clients known personally	log	0.150	**2.504**	0.086	1.238	0.056	0.846
D. Shocks							
Aggregate sales shock	ratio	0.182	**2.224**	0.193	**2.085**	0.148	**1.678**
Theft in past 12 months	Yes=1	-0.263	-1.592	-0.189	-1.019	-0.160	-0.908
E. Location							
In capital city	Yes=1	-0.628	**-1.874**	-0.374	-0.973	-0.336	-0.878
In another city	Yes=1	0.314	**2.658**	0.333	**2.321**	0.233	1.686
In Vakinankaratra region	Yes=1	-0.503	-1.543	-0.497	-1.384	-0.557	-1.642
In Fianar/hauts plateaux region	Yes=1	-1.048	**-3.117**	-1.205	**-3.163**	-1.164	**-3.014**
In Fianar/cotes et falaise region	Yes=1	-0.926	**-2.657**	-1.067	**-2.706**	-1.117	**-2.845**
In Majunga/plaines region	Yes=1	-0.455	-1.261	-0.520	-1.295	-0.367	-0.891
In Majunga/plateaux region	Yes=1	-0.998	**-2.754**	-0.936	**-2.324**	-0.781	**-1.916**
F. Entrepreneur's attitude							
Propensity to invest in business	index					0.156	**2.436**
Propensity to save	index					0.107	**2.644**
Propensity to spend on durables	index					0.004	0.088
Propensity to spend lavishly	index					0.075	1.024
Individualism	index					0.029	0.444
Altruism	index					0.053	0.953
G. Entrepreneur's family background							
Father has primary education	Yes=1					-0.029	-0.224
Mother has primary education	Yes=1					0.017	0.125
Father has secondary education	Yes=1					0.170	1.079
Mother has secondary education	Yes=1					-0.149	-0.749
Father's years of trade experience	log					0.130	**1.971**
Mother's years of trade experience	log					-0.188	**-2.824**
Number of adult brothers	log					-0.116	-1.138
Number of adult sisters	log					0.128	1.292
H. Past idiosyncratic shocks							
Growth in sales 94-95	rate					0.000	**2.872**
Growth in sales 95-96	rate					0.000	**3.441**
Intercept		5.955	**11.674**	7.846	**8.376**		
						5.860	**5.885**
Number of observations		687		672		672	
R-squared		0.5932		0.5074		0.5845	

(*) Regarded as endogenous.

	F stat.	p value	F stat.	p value	F stat.	p value
Joint test of non-farmily social capital	**14.28**	0.0000	**4.59**	0.0012	**4.21**	0.0023

Table 5. Determinants of Modes of Transaction

	Price info from clients and suppliers		Price info from messengers		Share of purchases on credit		Share of sales on credit		Share of purchases from regular suppliers		Share of sales to regular clients		Firm does not always inspect supplies		Clients do not always inspect supplies		Firm places orders from suppliers	
	Logit		*Logit*		*Tobit*		*Tobit*		*Tobit*		*Tobit*		*Logit*		*Logit*		*Logit*	
	Coef.	z stat.	Coef.	z stat.	Coef.	t stat.	Coef.	t stat.	Coef.	t stat.	Coef.	t stat.	Coef.	z stat.	Coef.	z stat.	Coef.	z stat.
A. Human capital and telephone																		
Access to telephone	-0.036	-0.166	-1.009	**-3.169**	-0.100	-1.063	0.026	0.900	0.087	1.339	0.038	1.237	0.157	0.599	-0.197	-0.725	0.056	0.216
Years of schooling	0.006	0.179	0.068	1.368	-0.022	-1.529	0.016	**3.318**	0.021	**2.032**	0.020	**4.329**	0.182	**3.625**	0.141	**2.827**	0.031	0.765
Years of experience	0.177	1.059	0.481	**2.135**	0.095	1.427	0.093	**4.184**	0.044	0.931	0.115	**5.133**	0.043	0.194	0.122	0.537	0.085	0.467
Speaks another language	1.079	**4.243**	-0.420	-1.231	-0.100	-0.959	-0.065	**-1.979**	-0.061	-0.850	-0.076	**-2.232**	-1.413	**-4.517**	-0.630	**-2.056**	0.295	1.043
B. Social capital																		
Relatives in agric. trade	-0.114	-0.586	-0.040	-0.147	-0.082	-1.032	-0.020	-0.773	0.048	0.848	0.066	**2.408**	-1.397	**-4.805**	-1.040	**-3.639**	0.512	**2.446**
Traders known	0.365	**2.177**	0.212	0.944	-0.031	-0.464	0.072	**3.407**	-0.048	-1.028	0.036	1.624	-0.054	-0.271	0.276	1.319	-0.433	**-2.403**
People who can help	0.127	0.666	-0.229	-0.938	0.085	1.032	0.023	0.917	0.010	0.184	-0.020	-0.768	0.233	0.913	0.051	0.207	0.005	0.024
Suppliers known personally	0.024	0.189	-0.035	-0.209	0.174	**2.872**	-0.039	**-2.319**	0.407	**9.820**	0.013	0.747	-0.057	-0.371	-0.045	-0.298	0.602	**3.708**
Clients known personally	0.433	**3.162**	0.385	**1.987**	0.043	0.790	0.091	**5.006**	0.034	0.876	0.086	**4.560**	0.147	0.881	0.199	1.126	0.038	0.256
C. Location																		
In capital city	0.938	1.491	15.526	**16.449**	1.528	**5.358**	-0.416	**-4.800**	0.348	**1.688**	-0.619	**-6.239**	0.017	0.015	-1.851	**-2.041**	0.112	0.170
In another city	-0.181	-0.680	0.243	0.824	0.229	**1.978**	-0.053	-1.567	0.010	0.128	-0.091	**-2.559**	-0.617	**-1.930**	-0.433	-1.439	-0.109	-0.357
In Vakinankaratra region	-1.090	**-1.714**	18.359	**22.625**	-0.006	-0.023	-0.333	**-3.865**	0.441	**2.159**	-0.197	**-2.016**	0.745	0.668	-0.205	-0.242	-0.063	-0.097
In Fianar/hauts plateaux	-0.972	-1.469	17.586	**22.374**	-0.233	-0.792	-0.297	**-3.309**	0.290	1.373	-0.378	**-3.737**	0.346	0.306	-0.108	-0.124	-0.557	-0.802
In Fianar/cotes et falaise	-0.378	-0.567	15.907	**16.736**	-0.001	-0.004	-0.316	**-3.466**	0.618	**2.855**	-0.404	**-3.922**	0.557	0.495	-0.013	-0.015	-0.691	-0.944
In Majunga/plaines	-0.437	-0.604	16.186	**15.695**	-0.085	-0.267	-0.540	**-5.407**	0.377	**1.662**	-0.327	**-3.038**	-2.249	**-1.684**	-1.598	-1.588	-0.296	-0.377
In Majunga/plateaux	-0.396	-0.574	16.100	.	-0.418	-1.290	-0.566	**-5.918**	-0.000	0.000	-0.335	**-3.206**	-3.272	**-2.184**	-2.642	**-2.391**	-0.890	-1.125
Intercept	-3.046	**-3.883**	-21.156	**-22.052**	-0.929	**-2.744**	-0.186	**-1.765**	-0.988	**-4.076**	-0.031	-0.270	-2.818	**-2.276**	-2.899	**-2.802**	-2.353	**-2.899**
					0.727		0.285		0.655		0.329							
Test of Social Capital	Chi-squ.	p-value	Chi-squ.	p-value	F stat.	p-value	F stat.	p-value	F stat.	p-value	F stat.	p-value	Chi-squ.	p-value	Chi-squ.	p-value	Chi-squ.	p-value
all social capital variables jointly	30.91	0.000	7.96	0.159	2.66	0.021	13.18	0.000	23.16	0.000	9.29	0.000	25.76	0.000	20.33	0.001	22.81	0.000
all except nber of relatives in agr	29.85	0.000	7.85	0.097	3.10	0.015	15.69	0.000	28.83	0.000	10.96	0.000	1.83	0.768	5.47	0.242	17.51	0.002
Number of observations	724		724		722		724		724		724		720		720		723	
Chi-square of the regression	162.69		115.63		355.40		252.82		231.30		195.43		136.56		100.14		56.68	
Pseudo R-squared	0.189		0.224		0.341		0.320		0.160		0.220		0.219		0.172		0.094	

Table 6. Effect of Social Capital on Value Added

		OLS		IV1			IV2		
		Coef.	t stat.	Coef.	t stat.		Coef.	t stat.	
A. Mode of Transaction									
Info. on prices from clients and suppliers	Yes=1	0.643	**4.757**	0.579	**1.820**	(*)	0.796	**2.458**	(*)
Info. on prices from messengers	Yes=1	1.016	**5.740**	1.255	**2.765**	(*)	1.088	**2.266**	(*)
Share of purchases with supplier credit	Share	0.474	**1.924**	0.760	1.099	(*)	1.727	**2.344**	(*)
Share of sales with credit to client	Share	0.911	**2.774**	0.738	1.114	(*)	-0.015	-0.020	(*)
Share of purchases from regular suppliers	Share	0.067	0.435	0.800	**2.188**	(*)	0.426	1.020	(*)
Share of sales to regular clients	Share	0.790	**3.413**	1.032	**1.865**	(*)	0.965	1.581	(*)
Firm always inspect quality of supplies	No=1	0.394	**2.325**	0.513	1.075	(*)	0.424	0.814	(*)
Clients always inspect quality of supplies	No=1	-0.287	-1.617	0.187	0.388	(*)	-0.012	-0.023	(*)
Firm places orders from suppliers	Yes=1	-0.521	**-3.494**	-0.950	**-2.736**	(*)	-0.909	**-2.462**	(*)
B. Capital and equipment									
Working capital	log	0.249	**6.890**	0.302	**3.278**	(*)	0.354	**3.514**	(*)
Dummy if subsidiary	Yes=1	0.678	**2.694**	0.655	**2.137**		0.667	**2.161**	
Value of equipment	log	0.003	0.100	-0.014	-0.367		-0.009	-0.237	
Storage capacity	log	0.111	**2.061**	0.059	0.705		0.026	0.317	
Number of vehicles	log	-0.074	-0.293	-0.309	-0.934		-0.190	-0.547	
Utilization of telephone	Yes=1	0.220	1.321	0.222	0.610	(*)	0.261	0.726	(*)
C. Labor and management									
Manpower (in months/year)	log	0.471	**4.056**	0.535	1.607	(*)	0.433	1.238	(*)
% of family members in total labor force	share	-0.317	-1.466	-0.986	-1.607	(*)	-0.443	-0.677	(*)
Dummy if full time trader	Yes=1	0.009	0.042	-0.050	-0.226		-0.040	-0.189	
Dummy if trader all year round	Yes=1	0.437	**2.527**	0.410	**1.730**		0.465	**1.898**	
Years of schooling of owner/manager	level	0.021	1.157	0.001	0.065		0.001	0.042	
Years of experience in agricultural trade	log	0.049	0.565	-0.038	-0.391		0.035	0.363	
Speaks another language	Yes=1	-0.237	**-1.749**	-0.119	-0.746		-0.108	-0.679	
D. Social capital									
Number of relatives in agric. trade	log	-0.194	**-1.693**	-0.139	-1.049		-0.108	-0.784	
Number of traders known	log	0.175	**2.128**	0.149	1.557		0.086	0.894	
Number of people who can help	log	0.187	**1.811**	0.190	**1.678**		0.249	**2.189**	
Number of suppliers known personally	log	0.206	**2.570**	0.067	0.612		0.139	1.217	
Number of clients known personally	log	-0.049	-0.673	-0.096	-1.125		-0.091	-1.071	
E. Shocks									
Aggregate sales shock	ratio	0.062	0.593	0.069	0.578		0.020	0.167	
Theft in past 12 months	Yes=1	-0.480	**-2.294**	-0.399	**-1.690**		-0.470	**-2.046**	
F. Location									
In capital city	Yes=1	-1.326	**-2.181**	-1.373	**-1.721**		-2.829	**-3.423**	
In another city	Yes=1	0.379	**2.695**	0.399	**2.342**		0.364	**2.176**	
In Vakinankaratra region	Yes=1	-1.083	**-1.845**	-1.365	**-2.040**		-1.750	**-2.647**	
In Fianar/hauts plateaux region	Yes=1	-0.945	-1.627	-1.238	**-1.921**		-1.676	**-2.613**	
In Fianar/cotes et falaise region	Yes=1	-0.571	-0.966	-0.955	-1.421		-1.450	**-2.146**	
In Majunga/plaines region	Yes=1	0.145	0.240	0.014	0.022		-0.552	-0.822	
In Majunga/plateaux region	Yes=1	-0.009	-0.015	0.063	0.094		-0.556	-0.832	
G. Entrepreneur's attitude									
Propensity to invest in business	index						0.106	1.364	
Propensity to save	index						0.129	**2.415**	
Propensity to spend on durables	index						0.127	**2.487**	
Propensity to spend lavishly	index						0.024	0.264	
Individualism	index						0.137	**1.680**	
Altruism	index						0.035	0.488	
H. Entrepreneur's family background									
Father has primary education	Yes=1						-0.261	**-1.669**	
Mother has primary education	Yes=1						0.109	0.666	
Father has secondary education	Yes=1						-0.095	-0.492	
Mother has secondary education	Yes=1						0.064	0.267	
Father's years of trade experience	log						0.055	0.661	
Mother's years of trade experience	log						-0.044	-0.535	
Number of adult brothers	log						-0.109	-0.847	
Number of adult sisters	log						-0.043	-0.341	
I. Past idiosyncratic shocks									
Growth in sales 94-95	rate						0.000	**4.085**	
Growth in sales 95-96	rate						0.000	**2.913**	
Intercept		3.776	**5.063**	4.284	**3.665**		2.643	**2.133**	
Number of observations		631		617			617		
R-squared		0.5619		0.5113			0.5689		

(*) Regarded as endogenous.

Joint test of non-family social capital		**5.530**	0.000	1.810	0.126		1.960	0.100	

Table 7. Effect of Social Capital on Total Sales

		OLS		IV1		IV2	
		Coef.	*t stat.*	*Coef.*	*t stat.*	*Coef.*	*t stat.*
A. Mode of Transaction							
Info. on prices from clients and suppliers	Yes=1	0.444	**4.050**	0.356	1.281 (*)	0.435	1.525 (*)
Info. on prices from messengers	Yes=1	0.566	**3.858**	0.444	1.118 (*)	0.200	0.476 (*)
Share of purchases with supplier credit	Share	0.377	**1.847**	0.710	1.170 (*)	1.234	**1.906** (*)
Share of sales with credit to client	Share	0.443	**1.658**	0.640	1.079 (*)	0.130	0.194 (*)
Share of purchases from regular suppliers	Share	0.190	1.509	0.807	**2.478** (*)	0.331	0.932 (*)
Share of sales to regular clients	Share	0.501	**2.641**	0.033	0.064 (*)	0.031	0.055 (*)
Firm always inspect quality of supplies	No=1	0.276	**1.981**	0.200	0.506 (*)	0.302	0.722 (*)
Clients always inspect quality of supplies	No=1	-0.171	-1.206	0.251	0.603 (*)	-0.001	-0.001 (*)
Firm places orders from suppliers	Yes=1	-0.122	-1.002	-0.041	-0.136 (*)	0.064	0.200 (*)
B. Capital and equipment							
Working capital	log	0.217	**7.207**	0.326	**3.944** (*)	0.358	**3.952** (*)
Dummy if subsidiary	Yes=1	0.917	**4.480**	1.028	**3.797**	1.057	**3.882**
Value of equipment	log	0.041	**1.672**	-0.001	-0.024	0.002	0.066
Storage capacity	log	0.143	**3.379**	0.043	0.661	0.011	0.167
Number of vehicles	log	-0.188	-0.962	-0.573	**-2.232**	-0.462	**-1.746**
Utilization of telephone	Yes=1	0.273	**1.995**	0.648	**1.987** (*)	0.812	**2.516** (*)
C. Labor and management							
Manpower (in months/year)	log	0.431	**4.833**	0.390	1.422 (*)	0.293	1.014 (*)
% of family members in total labor force	share	-0.352	**-2.009**	-1.716	**-3.139** (*)	-1.411	**-2.422** (*)
Dummy if full time trader	Yes=1	0.115	0.772	-0.014	-0.080	-0.008	-0.045
Dummy if trader all year round	Yes=1	0.503	**3.732**	0.519	**2.660**	0.571	**2.878**
Years of schooling of owner/manager	level	0.019	1.271	0.003	0.156	0.004	0.230
Years of experience in agricultural trade	log	0.030	0.417	0.015	0.181	0.084	0.987
Speaks another language	Yes=1	-0.212	**-1.892**	-0.217	-1.560	-0.180	-1.297
D. Social capital							
Number of relatives in agric. trade	log	-0.258	**-2.759**	-0.222	**-1.938**	-0.173	-1.447
Number of traders known	log	0.121	**1.833**	0.125	1.514	0.085	1.022
Number of people who can help	log	0.285	**3.426**	0.231	**2.403**	0.289	**2.982**
Number of suppliers known personally	log	0.050	0.765	-0.117	-1.242	-0.037	-0.385
Number of clients known personally	log	0.082	1.400	0.029	0.400	0.016	0.219
E. Shocks							
Aggregate sales shock	ratio	0.149	**1.867**	0.182	**1.969**	0.127	1.384
Theft in past 12 months	Yes=1	-0.262	-1.622	-0.197	-1.057	-0.222	-1.213
F. Location							
In capital city	Yes=1	-0.708	**-1.968**	-0.765	-1.390	-1.337	**-2.176**
In another city	Yes=1	0.343	**2.959**	0.286	**1.952**	0.224	1.562
In Vakinankaratra region	Yes=1	-0.445	-1.366	-0.521	-1.305	-0.601	-1.512
In Fianar/hauts plateaux region	Yes=1	-0.854	**-2.574**	-1.202	**-2.950**	-1.279	**-2.998**
In Fianar/cotes et falaise region	Yes=1	-0.774	**-2.238**	-1.177	**-2.724**	-1.328	**-2.949**
In Majunga/plaines region	Yes=1	-0.207	-0.578	-0.378	-0.899	-0.462	-1.018
In Majunga/plateaux region	Yes=1	-0.682	**-1.892**	-0.677	-1.590	-0.787	**-1.721**
G. Entrepreneur's attitude							
Propensity to invest in business	index					0.122	**1.791**
Propensity to save	index					0.105	**2.309**
Propensity to spend on durables	index					0.030	0.676
Propensity to spend lavishly	index					0.088	1.141
Individualism	index					0.073	1.062
Altruism	index					0.036	0.587
H. Entrepreneur's family background							
Father has primary education	Yes=1					-0.085	-0.638
Mother has primary education	Yes=1					0.059	0.414
Father has secondary education	Yes=1					0.080	0.494
Mother has secondary education	Yes=1					-0.081	-0.403
Father's years of trade experience	log					0.114	1.629
Mother's years of trade experience	log					-0.148	**-2.130**
Number of adult brothers	log					-0.138	-1.253
Number of adult sisters	log					0.128	1.218
I. Past idiosyncratic shocks							
Growth in sales 94-95	rate					0.000	**3.000**
Growth in sales 95-96	rate					0.000	**3.194**
Intercept		6.124	**12.305**	7.371	**7.722**	5.907	**5.736**
Number of observations		683		668		668	
R-squared		0.6241		0.5452		0.5942	
(*) Regarded as endogenous.							
Joint test of non-family social capital		**8.020**	0.000	**2.870**	0.022	**3.060**	0.016

Appendix Table: Instruments Set

A. Family background	Unit	Mean	Std. dev.
Number of children	Number	3.3	2.3
Age of owner/manager	Years	37.6	9.4
Age squared	Years sq.	1502.7	787.3
Gender	Female=1	45.7%	
Born in capital city	Yes=1	4.6%	
Born in another city	Yes=1	15.6%	
Born in municipality where operates	Yes=1	31.9%	
Of foreign ascent	Yes=1	1.2%	
Married	Yes=1	76.7%	
Christian	No=1	8.8%	
Number of brothers aged 15 and above	Number	2.5	1.6
Number of sisters aged 15 and above	Number	2.4	1.5
Number of sons aged 15 and above	Number	0.9	1.2
Number of daughters aged 15 and above	Number	0.8	1.1
Father was a farmer	Yes=1	62.7%	
Mother was a farmer	Yes=1	64.3%	
Father has primary education	Yes=1	32.7%	
Father has high school education	Yes=1	26.1%	
Mother has primary education	Yes=1	39.6%	
Mother has high school education	Yes=1	9.7%	
Years of experience of father in trade	Years	4.1	9.9
Years of experience of mother in trade	Years	4.1	10.0
Years of experience of father in agricultural trade	Years	2.6	8.3
Years of experience of mother in agricultural trade	Years	2.8	8.5
Number of close parents with regular wage employment	Number	1.9	1.6
Number of close parents in trade in general	Number	0.9	1.3
B. Business start-up experience			
Start-up capital	'000 FMg.	2011	4283
Was helped by family and friends at start-up	Yes=1	53.2%	
Learned trade alone	Yes=1	52.2%	
C. Personal assets and financial situation			
Value of personal house	'000 FMg.	9901	24397
Dummy if has a personal car	Yes=1	5.1%	
Owner or spouse has a farm	Yes=1	68.5%	
Owner or spouse has another business	Yes=1	16.1%	
Owner or spouse has a regular wage job	Yes=1	17.3%	
Owner or spouse has another regular income	Yes=1	11.1%	
Has a bank account	Yes=1	15.7%	
Has a bank line of credit	Yes=1	1.2%	
Balance of savings account	'000 FMg.	309	1963
Participates to ROSCA or savings association	Yes=1	2.6%	
D. Communications			
Has a telephone	Yes=1	5.1%	
Has access to a telephone	Yes=1	56.5%	
Has a fax machine	Yes=1	0.5%	
Has access to a fax machine	Yes=1	21.8%	

Appendix Table: Instruments Set continued

E. Solidarity and friends	Unit	Mean	Std. dev.
Has ever helped someone in difficulty with trade business	Yes=1	76.3%	
Has ever been helped when in difficulty with trade business	Yes=1	75.0%	
Number of suppliers meet in community	Number	1.2	3.1
Number of clients meet in community	Number	2.3	3.4
F. Competition			
Respondent is not main buyer from any supplier	Yes=1	43.8%	
Respondent is not main supplier for any client	Yes=1	21.9%	
Respondent is main buyer from most suppliers	Yes=1	19.8%	
Respondent is main supplier for most clients	Yes=1	33.6%	
Can tell how many other traders buy from own suppliers	No=1	69.1%	
Can tell from how many other suppliers own clients buy	No=1	59.3%	
Number of other traders who buy from own suppliers	Number (1)	9.8	10.3
Number of other suppliers own clients buy from	Number (1)	6.3	8.6
G. Perceptions about conditions for success in trade			
Personal reputation and relationships	Rank (2)	3.5	0.9
Access to credit	Rank (2)	2.0	1.0
Purchase price	Rank (2)	3.0	0.8
Sale price	Rank (2)	3.2	0.7
Transport equipment	Rank (2)	2.5	1.2
Capacity/willingness to grant credit	Rank (2)	1.7	0.8
H. Perceptions about future			
Hope own children will pursue same business	Yes=1	34.9%	
I. Perceptions about solidarity, saving, and investment			
a. The rich and the poor			
"The poor are poor because they are lazy"	Rank (3)	2.2	1.1
"The poor are poor because they have no one to assist them"	Rank (3)	2.9	1.0
"The rich have more friends than the poor"	Rank (3)	1.4	0.8
b. Individualism			
"I'm only proud of what I accomplish without others' help"	Rank (3)	1.6	1.1
"The money that my spouse and I earn belongs to us alone"	Rank (3)	1.2	0.6
"I solve my financial problems by myself"	Rank (3)	1.6	0.9
"Family is the most important thing in life"	Rank (3)	1.2	0.7
c. Helping others			
"I help others when they are in need"	Rank (3)	2.2	0.9
"I couldn't have become what I am without my family's help"	Rank (3)	2.8	1.2
d. Risk coping strategies			
"I have put money aside for difficult times"	Rank (3)	2.6	1.4
"I can count on my friends and family with in trouble"	Rank (3)	2.4	1.2
"'If my business failed, I would have to sell my possessions to survive"	Rank (3)	3.6	1.3
"If I became poor, my family and friends would help me"	Rank (3)	2.6	1.1
"If my business failed, it wouldn't matter because I have other activities"	Rank (3)	3.6	1.4
e. Prosperity, saving, and investment			
"If my business prosper, my family and friends will live at my expenses"	Rank (3)	2.8	1.3
"If I had a lot of money, I would spend it all to live on the fast lane"	Rank (3)	4.7	0.6
"If I had a lot of money, I would build a big house and buy a car"	Rank (3)	3.2	1.4
"If I had a lot of money, I would save it for the future"	Rank (3)	3.3	1.3
"If I had a lot of money, I would invest it in business"	Rank (3)	1.9	1.1

(1) Computed for the sub-sample of firms who could tell how many there are.
(2) Ranked from 1=not important to 4=very important.
(3) Ranked from 1=quite true to 5=quite false.