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Does forced solidarity hamper entrepreneurial activity? Evidence from seven West-African countries

(M. GRIMM, Erasmus University of Rotterdam, Netherland; F. GUBERT, IRD-DIAL, France; O. KORIKO, Afristat, Mali, J. LAY, University of Goëttingen, Germany, C.J. NORDMAN, IRD-DIAL, France)

Does forced solidarity hamper entrepreneurial activity? Evidence from seven West-African countries[♣]

Michael Grimm[♠]
International Institute of Social Studies, Erasmus University Rotterdam, The Hague, The Netherlands

Flore Gubert
DIAL-IRD, Paris, France

Ousman Koriko
AFRISTAT, Bamako, Mali

Jann Lay
German Institute of Global and Areas Studies (GIGA), Hamburg and University of Göttingen, Germany

Christophe J. Nordman
DIAL-IRD, Paris, France

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Abstract – Today, it is widely recognized that social networks are an important determinant for entrepreneurial success, in particular in a context in which capital, labour and insurance market imperfections prevail. However, many anthropologists emphasize that some forms of social networks, such as kinship ties can also have adverse effects because such ties are often based on abusive redistributive pressure and forced solidarity. The empirical backup of such effects is rather weak and the existing evidence is rather of anecdotic nature. In this paper, we develop a model of the urban household and derive testable assumptions on how social network capital affects the household's allocation of resources to productive activities. Using an original data set of West-African entrepreneurs, we find that local social networks within the city have positive effects on factor use and hence value added. Transfers within these local city networks seem to be based on reciprocity. However, we also find robust negative effects associated with social networks tied to the village of origin. These effects get diluted with geographical distance, probably because with rising distance it is easier to hide the generated income and to protect it from abusive demands. We also find evidence that households transfer less out of profits if they split up their enterprises. An expansion of formal support mechanisms that can help if social networks are lacking and the implementation or expansion of existing basic support systems, in particular insurance against basic risks may reduce the necessity for inter-household transfers and make it easier for entrepreneurs to save and to invest.

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[♠] Corresponding author: Michael Grimm, International Institute of Social Studies, Erasmus University Rotterdam, Kortenaerkade 12, 2518 AX The Hague, The Netherlands, Phone: +31-70-4260694, Fax: +31-70-4260799, E-mail: grimm@iss.nl.

Ici en Afrique, quand tu n'as pas ta famille à côté, il faut savoir que tu vas souffrir.
(Rasmané, 45 ans, tailleur, Ouagadougou, 2009)[1]

En Afrique, tu ne dis même pas à ta femme, quand tu as de l'argent.
(Thérèse, 42 ans, comptable, Ouagadougou, 2010)[2]

1. Introduction

The economic literature emphasizes the benefits of social networks such as the reduction of transaction costs, the reinforcement of collective action, or the generation of learning spin-offs (see e.g. Fafchamps, 1996, 2001, 2002 and Minten and Fafchamps, 1999). Numerous examples illustrate the important related role that social networks, in particular the (extended) family, can play in supporting entrepreneurship. Yet, social networks can also be seen as an important constraint faced by the informal entrepreneur (see e.g. Portes and Sensenbrenner, 1993; Platteau, 2000; Hoff and Sen, 2006; Luke and Munshi, 2006). In Sub-Saharan Africa, for instance, it is not unusual that individuals live in very large households and entertain strong links with the members of their extended family. Such links are frequently characterised by, among other things, significant resource flows in goods, services and money without any direct return. Such transfers can be motivated by insurance considerations, altruism or simply be the result of prevailing egalitarian norms which require that the wealthier transfers to the poorer. These transfers may flow continuously or may only happen at the occasion of shocks on expenditures such as crop failure, illness or costly ceremonies.

In principle, it is possible that such transfers occur voluntarily and that no adverse incentive effect results from them. However, if societal pressure for redistribution is the main motivating factor, such transfers might put brakes on entrepreneurial activity. Platteau, for instance, reports that in tribal societies, in particular, in those which are characterized by strong traditions "the economic success of an individual [may] breed[s] parasitic behaviour, which […] does not stop until the rich individual is ruined and brought back to the fold" (Platteau, 2000, p. 208). Platteau even emphasizes that "the negative effects of traditional norms of generosity and redistribution in terms of incentives to savings and innovations are not confined to the countryside but may also affect modern cities where many proprietors are unable to resist kinship demands to any great extent, especially so in Sub-Saharan Africa" (Platteau, 2000, p. 209).

If 'forced solidarity' of this type exists, an entrepreneur might have little incentive to invest (or even be unable to save) and to innovate, if a larger business and higher profits simply mean that even more has to be transferred to the kin. If such behaviour is widespread it may partly explain the failure of many African micro and small enterprises to grow. As pointed out by Platteau (2000), it might also explain why minority entrepreneurs like the Indians in East Africa and the Lebanese and Syrians in West Africa are often so successful and contribute so crucially to the development of the private sector of that region. In fact, so the argument, these minorities are not directly exposed to requests of relatives and stand outside the complex web of social obligations.

There is an emerging literature analyzing the nature and causes of heterogeneity in capital returns of micro and small enterprises in low and middle income countries (Banerjee and Duflo, 2004; McKenzie and Woodruff, 2006; De Mel, McKenzie and Woodruff, 2008). All

[1] Quote taken from Pasquier-Doumer (2010).
[2] Own interview (Grimm), conducted in Ouagadougou in March 2010.

these studies found heterogeneous returns and pointed to particular high returns at the lower end of the capital distribution, i.e. for very small firms. This is a puzzling result. If returns are so high why do firms not reinvest and grow? De Mel *et al*. (2008) analyze two possible explanations: imperfect capital markets and risk aversion. They find empirical evidence for the former but not for the latter. Grimm, Krüger and Lay (2010) found similar results using the same data set as in the present paper. Studying the role of social networks and their potential adverse affects, this paper studies another potential constraint and thus also hopes to contribute to this literature.

To date, there is very little empirical backup for the existence of negative effects of social networks on entrepreneurial activities. Some related evidence however indicates that the composition and structure of the households matter for capital accumulation, e.g. that larger polygamous households find it more difficult to save and accumulate (Morrisson, 2006). Duflo *et al.* (2009) put forward a similar argument, when showing that impatient Kenyan farmers forgo highly profitable investments in fertilizer. The authors argue that the impatience is partly rooted in the difficulty of protecting savings from consumption demands. Di Falco and Bulte (2009) find some evidence that kinship size is associated with higher budget shares for non-sharable goods. They also find evidence that compulsory sharing leads to free riding and attenuates incentives for self-protection against shocks (Di Falco and Bulte, 2010). Lastly, Baland, Guirkinger and Mali (2007) analyze borrowing behaviour and find that some people take up credits even without liquidity constraint – just to signal to their kin that they are unable to provide financial assistance.

In this paper, we will analyze whether social networks, more specifically, those related to the family and kin, act as a constraint to potentially successful entrepreneurs. This implies testing the alternative hypothesis, namely that social networks, in contrast, have a positive effect on firm performance, for example by easing other constraints, for example on credit and insurance markets. These hypotheses are put to test using an original data set covering informal entrepreneurs in seven West-African agglomerations. We find that local social networks within the city have positive effects on factor use and hence value added. Transfers within these local city networks seem to be based on reciprocity. However, we also find robust negative effects associated with social networks tied to the village of origin. These effects get diluted with geographical distance, probably because with rising distance it is easier to hide the generated income and to protect it from abusive demands. We also find evidence that households transfer less out of profits if they split up their enterprises.

The remainder of this paper is organized as follows. Section 2 develops a simple theoretical household model illustrating how sharing obligations may adversely affect the allocation of resources to the household business. Section 3 presents the context of this study and the used data sources. Section 4 describes the correlation between various types of household transfers and proxies of social network capital. Section 5 analyzes how redistributive pressure affects capital accumulation, labour demand and labour supply provided by the owner to the firm. Section 6 analyzes the effects of social network capital on total value added. Section 7 tests whether social network capital does also affect technical efficiency. Section 8 concludes.

2. Theoretical framework

2.1 Basic Set up

We develop a simple static model of an urban household who engages in a production activity that should be thought of as a (non-agricultural) household firm.[3] This model, which draws on a more general version described in detail in Grimm, Lay, Thiele and Wiebelt (2010), takes into account the interdependence of household production and consumption. Hence, inspired by the literature on agricultural households (see e.g. Singh, Squire and Strauss, 1986; Sadoulet and De Janvry, 1995), we assume that urban households can be represented by a model that combines the household and the firm, the two fundamental units of microeconomic analysis .

For any production cycle, the household is assumed to maximize an increasing and quasi-concave utility function:

$$\text{Max } U = U(X, l), \tag{1}$$

where X denotes consumption of market goods and l stands for leisure, a non-market good. Utility is maximized subject to the following cash income constraint:

$$p\,(Q - X) + R + wL^h + rK^h + p_v\,V \leq p\,F(L, K, V) + w\,L^m + S \tag{2}$$

$$\text{with } K^h \geq 0$$

where p is the price of the market-purchased goods. $(Q - X)$ is the household's marketed surplus of the good. If this term is negative the household is a net buyer of this good. R stands for transfers paid to other households. R is assumed to be endogenous and is specified below. The household has to pay for hired labour L^h at the wage rate w, for rented capital goods K^h at the rental rate r and for intermediate inputs V (such as raw materials, energy or water) at the unit price p_v. On the right hand side of (2), we have income that is generated through production F and sold at the market price p_i, labour offered on the market at the wage rate w and an exogenous cash endowment S. The cash endowment can result from past savings, transfers received ahead of production from other households or from loans (from formal or informal money lenders). We assume that it is not possible to rent out capital goods.

We assume that expenditures on rented capital and intermediate inputs have to be incurred before production and this requires financial liquidity (or working capital):

$$S \geq rK^h + p_v\,V. \tag{3}$$

The cash endowment of the household may suffice to cover these costs or not. Hence, this credit constraint may or may not be binding.

The household also faces a time-constraint, i.e. it cannot allocate more time to work outside the household, production and leisure than is available in the household:

$$E^l = L^o + L^m + l, \tag{4}$$

where L^o stands for informal labour supplied to the own business and E^l is the total stock of household time.

[3] In reality, the household may be engaged in a variety of such activities, run by different individual household members. In our theoretical model, we nonetheless assume that the household only operates a single activity. We return to this issue in our empirical analyses below.

Moreover, the following resource constraints must be satisfied:

$$L = L^f + L^h \quad \text{and} \tag{5}$$

$$K = K^f + K^h. \tag{6}$$

At this stage it is assumed that own informal labour L^f and hired informal labour L^h are perfect substitutes.

We further assume that the household operates with the following increasing and concave production technology:

$$Q = F(L, K, V, Z^h), \tag{7}$$

where Z^h are exogenous household characteristics including those of the owner, such as education and experience. Z^h is assumed to affect the total factor productivity. We make standard assumptions on the marginal products of capital and labour, i.e.

$$\partial F/\partial L > 0, \quad \partial^2 F/(\partial L)^2 < 0, \quad \partial F/\partial K > 0, \text{ and } \partial^2 F/(\partial K)^2 < 0 .$$

In this basic set-up we ignore any risk related to production.

Transfers R to be paid to other households are assumed to be a share of the firm's value added, VA (turnover minus the costs for intermediate inputs), i.e. transfers are treated like a tax:

$$R = s\, VA, \quad \text{with} \quad 0 \leq s \leq 1 \tag{8}$$

and

$$VA = p\, F(L,K,V,Z^h) - p_v V \tag{9}$$

In the most general case, the share s (the "tax rate" or "solidarity tax") depends on egalitarian norms prevailing in the entrepreneur's kin, N, on the size of the kin, T, and on the costs to observe the entrepreneur's profits, C, thus

$$s = f(N, T, C) \tag{10}$$

with

$$\partial s/\partial N > 0 , \quad \partial s/\partial T > 0 , \text{ and } \partial s/\partial C < 0 .$$ [4]

Our idea is that the kin can easier observe the firm's value added than labour income from the market. This should in particular be true if firms exceed a certain size and thus operate from of a fixed location, exceed a certain level of capital stock and employ non-family labour. Earnings from jobs outside the household are hence assumed to be more difficult to observe

[4] The model could be extended to allow s also to depend on the level of value added itself (e.g. increasing in value added, i.e. a progressive tax).

for the kin. A civil servant in Ouagadougou told us, for instance, that he prefers to have a motorbike instead of a car, as a car would immediately give a signal to the family that he earns a good salary. Although, the assumption of non-observability might be strong in case of a high-ranking employee in the public sector, but in the economies we study here less than seven percent are employed in the public sector and of those less than 30 percent are classified as '*cadre supérieur*'. By far, the largest share of employment is in informal firms, often without any written labour contract, any payment statements and any agreement regarding the term of the employment (77.4 percent) (Brilleau, Roubaud, Torelli, 2005).[5]

We assume that all prices in the model (p, p_v, w, r) are exogenously given and not affected by the actions of the household. Thus, the household behaves like a price taker in the four markets.

2.2 Solution under perfect markets

Although the model described above implies one market imperfection – physical capital cannot be rented out – a household can still behave like a profit maximizer. If the credit constraint is not binding, the model is recursive and separability holds. The household hence uses capital and labour such that marginal returns are equal to marginal costs. Note that the marginal returns to capital and labour are net of the remittances that have to be paid to other households. Additional labour and capital is hired at the respective market rates. If family labour endowments exceed the optimal level of labour necessary for production, informal labour is rented out (or additional labour is hired in if more labour is optimal).

Hence, under complete markets, we get the following first-order conditions:

$$(1-s)\frac{\partial Q}{\partial L} = \frac{w}{p} \tag{11}$$

$$(1-s)\frac{\partial Q}{\partial K} = \frac{r}{p} \tag{12}$$

$$\frac{\partial Q^n}{\partial V} = \frac{p_v}{p} \tag{13}$$

$$\frac{\partial U}{\partial l} \Big/ \frac{\partial U}{\partial X} = \frac{w}{p} \tag{14}$$

It is straightforward to see that the choice variables X and l do not affect the demand for the production factors L and K (provided second order conditions are also met). The maximisation problem is recursive and the maximised value of profits can be substituted in Equation (2), which yields:

$$Y^* = \Pi + \bar{S} + w\,(L^m + X^l), \tag{15}$$

where Y^* is the value of full income associated with profit-maximising behaviour and Π are profits from the informal business, i.e. value added minus all costs for labour, capital, inputs

[5] For a detailed analysis of employment vulnerability in the seven West African countries we study, see Bocquier, Nordman and Vescovo (2010).

and made transfers, R. Conditional on full income, households maximize utility, hence the problem is separable. From Equation (14) one can derive the demand equations for X and l as functions of prices (p, w) and full income (Y^*).

In Grimm *et al.* (2010) we discuss solutions under various assumptions on market imperfections. In this paper, we skip this discussion and focus only on the role of social networks represented by the solidarity tax.

2.3 The role of transfers and the solidarity tax

From Equations (11) and (12) we see that solidarity tax on value added drives a wedge between the marginal factor products and real factor prices. Ceteris paribus, households allocate less labour and capital to production the higher the tax rate s. In the case of labour, this implies that with higher s less labour is hired or more family labour is offered to dependent wage work outside the household.

Value added will hence be lower at higher solidarity taxes and under the assumed neoclassical production technology with decreasing marginal returns this implies that marginal factor products will be higher. Subsequently, we will thus test the following hypotheses: For two different households 1 and 2, facing s_1 and s_2, where $s_1 > s_2$, we expect $L_1 < L_2$, $K_1 < K_2$ and $VA_1 < VA_2$.

3. Context and Data

3.1 Context

In this study, we focus on households and entrepreneurs in seven agglomerations in West-Africa: Cotonou (Benin), Ouagadougou (Burkina Faso), Abidjan (Côte d'Ivoire), Bamako (Mali), Niamey (Niger), Dakar (Senegal) and Lomé (Togo). In West-Africa, as in other parts of Africa, the extended family and kinship networks are pronounced and important. For Burkina Faso, Pasquier-Doumer (2010) reports that social networks are widely used at various occasions in life, for instance to find employment or to fill a position, to find accommodation or to get financial assistance when necessary, in particular for schooling expenditure, occasional ceremonies or to cope with health problems.[6] More specific evidence on the role of social networks with regard to entrepreneurial activities is provided by Chukwuezi (2001) for the Nigerian case. He shows that urban businessmen from the Igbo in Nigeria remain strongly linked to their rural kin. These ties included a commitment to make transfers to and invest in their rural home communities. Theses efforts – not their business success – were determining how they were regarded at home. Chukwuezi (2001) also claims that these links have been weakened recently. Younger generations would put less importance on kinship ties and financial demands based on cultural obligations would be seen as a burden rather than an arrangement for mutual benefit. In fact, there are numerous examples of how villagers ensure that traditional customs prevail, for example by punishing defecting community members through the denial of a burial in the rural home or exclusion from the community (Chukwuezi, 2001). The sharing obligations of out-migrants are also illustrated by the following quote from Hessling (2006) of a professor from Benin "It is not formal, but when there is something happening in the village, one of the elders will send me a message and I will help out. So I have to go help. I have to pay my participation. Obligatoirement, voilà, les formes de solidarité".[7] These highly selective pieces of anecdotal evidence illustrate that solidarity and

[6] These findings are based on interviews conducted in Ouagadougou with financial support by the Institut de recherche pour le développement (IRD).

[7] This review is far from complete and will be extended in future versions of the paper.

sharing obligations – supported by social networks – constitute an important aspect of social and economic life in Western Africa. While designed for the mutual benefit of community members, solidarity norms and rules seem to be (increasingly) percieved as a burden by some.

3.2 Data

For our empirical analysis we use a set of surveys called 1-2-3 surveys or in its French synonym "Enquêtes 1-2-3". A 1-2-3 survey is a multi-layer survey organized in three phases and specially designed to study the informal sector (see Brilleau, Ouedraogo and Roubaud, 2005). Phase 1 is a representative labor force survey collecting detailed information about individual socio-demographic characteristics and employment. Phase 2 is a survey which interviews a sub-sample of informal production units identified in Phase 1. The focus of this phase is on the characteristics of the entrepreneurs and their production unit, including the characteristics of employed workers. It also contains detailed information on costs, input use, investment, sales and the unit's forward and backward linkages. Phase 3 is a household expenditure survey interviewing (again) a representative sub-sample of Phase 1 and hence part of the Phase 2 households. The data of all three phases is organized such that it can be linked. Hence, for a (representative) sub-sample of informal entrepreneurs we have information from Phase 1 and Phase 2 (n=6,580) and, again for a subsample, information from all three phases (n=1,511). Phase 3 is not available for Abidjan, given the onset of violent actions in the country in 2001/02, the third part of the survey could not be undertaken there.

Besides the detail of information, a major advantage of the 1-2-3 survey is that Phase 1 ensures that Phase 2 delivers a representative picture of the informal sector, because being sampled does for instance not depend on whether the entrepreneur has a fixed location or simply operates a business at home or in a fully mobile way. Thus this survey also includes entrepreneurs who are likely to be overseen in one-stage surveys where the sample population is produced from enterprise sampling frames. The 1-2-3 surveys define informal enterprises as small production units that (a) do not have written formal accounts and/or (b) are not registered with the tax administration. Part (b) of this definition varies slightly between countries, as registration may not always refer to registration with tax authorities. The 1-2-3 surveys do not apply a size criterion.[8]

Focusing on informal enterprises means of course ignoring all formal enterprises and in particular ignoring firms that are larger in terms of their labor force and their capital stock and that probably show, on average, a better growth performance. However, as shown in previous work using the same data (see Grimm, Krüger and Lay, 2010), heterogeneity among informal firms in terms of capital stock and performance (for example, capital returns) is likely to be sizeable enough to shed light on the effects of social networks.

3.3 Descriptive Statistics

Table 1 presents descriptive statistics of the entrepreneurs, their enterprises and the households they belong to. We present these statistics from two different angles. First, we consider each individual enterprise. Then, there are households that appear more than once in the sample given that about 20 percent of all households have more than one enterprise (Sample A). Second, we consider a sample where we aggregate all enterprises in a given household into one single enterprise (Sample B). This aggregation is done as follows: We

[8] For a detailed presentation of the data, see Brilleau, Ouedraogo and Roubaud (2005).

define the main firm in the household as the firm that generates the highest value added. Then we add within each household total labour, total capital and total value added. Regarding all other characteristics such as the sector of the firm and characteristics of the owner, we keep the values from the main (highest value added) firm. There may be various reasons why a household owns several enterprises. Diversifying entrepreneurial activities may represent an optimal portfolio choice in the presence of activities with different expected returns and associated risks. Enterprises may also belong to different household members that do not necessarily pool their resources. Finally, splitting activities may serve as a strategy to avoid 'taxes' or demands from the extended family, because it is easier to hide several smaller enterprises than one large enterprise. Moreover, Camilleri (1996) provides anecdotic evidence that successful entrepreneurs employ their kin in peripheric firms to keep them away from the main and productive activity. The two latter aspects make it particularly important and interesting to consider these two samples in our context.

[Table 1 about here]

We see that about half of all entrepreneurs in our sample are men, they are on average 36 years old, about 48 percent of them speak French. 70 percent do not have any diploma, 20 percent have completed primary school and only 10 percent have a diploma from a general or vocational secondary school or higher. We also coded a variable for ethnicity. In ethnic group '1' are those entrepreneurs who belong to the largest ethnic group in the respective country. Ethnic group '2' are those who belong to the second largest group and so on. One can see that about 70 percent of all entrepreneurs fall into one of the three largest groups in their country. About 45 percent of all entrepreneurs are migrants who have lived elsewhere (mostly in the same country) before coming to the economic capital.

The next block in Table 1 reports the activity portfolio of the entrepreneur's household. These portfolios consider all primary and secondary activities of all household members. About 79.6 percent of all entrepreneurs live in households that run one (82.4 percent of those) or several informal firms (17.6 percent). In some of these households, one or several household members are additionally engaged in some dependent informal wage work or as family workers. Only 19.8 percent of all entrepreneurs live in households who have (in addition to their enterprise) at least one wage worker in the public sector (10.3 percent) or in the formal private sector (9.5 percent). The activity portfolio is a potential important factor of firm performance, as it may influence the capacity to save, to take a loan and to invest. It may also determine the business' network size and shape the relation to the public sector and hence affect access to public services and exposure to corruption.

The mean age of these enterprises is about eight years. Table 1 also shows the distribution across sectors and countries. The largest sector is 'petty trading'. In terms of countries, the sample is uniformly distributed given that the surveys all had similar sample sizes, except for Niger, which is a little bit smaller. The average annual value added is about 5,370 international 2005 dollars. Entrepreneurs work on average 200 hours per month in their enterprise. In total, they use about 338 hours of labour per month. Mean employment is about 1.5 including the owner and, on average, only one out of five enterprises hires a paid employee. 14 percent of all enterprises do not report any invested physical capital. Hence, it is not surprising to see that the mean capital stock for the lower third in the distribution of capital is just about 10 international dollars. The capital stock of the middle third is about 95 international dollars and the capital stock of the top third is about 2,900 international dollars. If we compare these statistics with those computed over the sample, in which we aggregated all enterprises within the same household (Sample B), we find no substantial differences for

most of the characteristics such as age, education and the distribution across sectors and countries. However, in sample B, average value added, employment and capital stock are for obvious reasons larger.

3.4 Measures of Social Networks

From our data set, we have drawn the following proxies of social networks, which in turn should determine the size of the solidarity tax, *s*. First, the share of the population from the same ethnic group in the cluster in which a household resides. This share is computed from Phase 1 using population weights such that it exactly reflects the true share in the total population. Clusters correspond to neighbourhoods in each of the agglomerations represented in our sample. There are about 125 per country (city) and they cover a population from about 300 up to 35,000. This measure of ethnic concentration is an obvious measure of potential redistributive pressure. The higher the concentration of the own kin-group in the neighbourhood, the higher this pressure should be. However, a higher concentration of the own-kin group may also mean more support for *own* entrepreneurial activities. The empirical question, we will attempt to answer below, is whether these positive effects dominate or whether the above model that claims a negative effect is true. Most likely both effects will be at work, probably off-setting each other to some extent. Hence, more precisely, we will assess the 'net effect' of social network proxies in our empirical analysis. In this regard, we should also note that this first social network proxy cannot be considered as fully exogenous, given that location is a choice. Our second proxy for social networks is the share of the population in the respective cluster that grew up in the same area as the enterprise owner – i.e. in the same region or district of the country. Again we assume that the higher the share the higher the pressure for redistribution. But here again, the measure will capture both the potential negative and positive effects of social networks. Third, we use the geographical distance to the entrepreneur's region or district of origin (regional or district capital). We compute this distance for every entrepreneur using geographical maps. For entrepreneurs who were born at their current place of residence this distance is set to zero. We assume that a longer distance makes it more difficult and costly to observe the entrepreneur's activities and productivity and hence redistributive pressure is supposed to decline with distance. Moreover, the costs of making transfers may also increase with distance in the absence of any formal banking system. However, this should not affect the amount that is transferred but rather the decision to transfer and the frequency of transfers. Obviously, positive social network effects should also decline with distance. Ideally of course one would like to have the travel time or the travel costs. However this would need to be collected in the field and hence is left for a future version of this paper.[9] Fourth, we use also population density and the total fertility rate in the area of origin to measure the potential size of the kin. Population density is taken from census data and the total fertility rate from Demographic and Health Survey (DHS) data with data sources as close as possible to the 1-2-3 survey year.[10] Whenever we focus on the latter two variables, we restrict our analysis to migrant entrepreneurs (i.e. persons who lived elsewhere before coming to the economic capital) because both population density and the total fertility rate cannot appropriately be measured for the various kin groups in the city. Whenever relevant, we control for ethnicity in our analysis, i.e. if we focus on the distance measure we compare two individuals from the same ethnic group living in different distance to his or her village of origin. Table 2 shows the descriptive statistics for these variables, again for both samples, Sample A and Sample B.

[9] However, we made this exercise for Burkina Faso and found a rank correlation coefficient of more than 75% between distance and travel time and distance and travel costs.

[10] See http://www.measuredhs.com/.

[Table 2 about here]

The average of the shares of the population from the same ethnic group within clusters is 38 percent, however with a large standard deviation of 27 percent. The average of the population share with the same area of origin is much smaller with 1.6 percent. Here as well, the standard deviation is relatively high (3 percent). For both measures there are no significant differences between Sample A and Sample B. The distance to the area of origin is on average 77 km. In sample B this distance is larger by 10 km. Considering only migrant entrepreneurs increases this distance to 172 km. Population density in the area of origin, which we only compute for migrant entrepreneurs, is about 300 inhabitants per km^2. Here again the variance across observations is high. The total fertility rate is about 5.9 children per women (standard deviation 1.3).

4. Forced solidarity and transfers: Can we measure redistributive pressure?

The 1-2-3 survey asks households to report what they have transferred to and received from other households in cash or in kind. In-kind transfers are given in self-estimated money values. We use this information on transfers to examine the conditional correlation between the social network proxies presented above and both made and received transfers. A significant positive correlation between a network proxy and transfers would have a twofold interpretation. First, it would demonstrate that redistributive pressure on households by the kin indeed exists. Second, it may be taken as sign that our proxies indeed capture the density of social networks. We estimate the following regression:

$$\ln T_i = \beta_{T0} + P_i^{'}\beta_{T1} + \beta_{T2}\ln VA_i + X_{ji}^{'}\beta_{T3} + Z_i^{'}\beta_{T4} + C_i^{'}\beta_{T5} + \vartheta_{Ti}\,, \qquad (16)$$

where $\ln T_i$ stands alternatively for the logarithm of given or received transfers by household i. P_i is the vector of variables used to measure social networks. VA_i is value added. X_{ji} is a vector of characteristics specific to the entrepreneur j residing in household i, such as age, gender, education and migrant status. Z_i is a vector of household characteristics such as ethnicity and the activity portfolio of the household. The vector C_i controls for country effects. Hence with this regression, we explore the correlation between the various measures of social networks and transfers, holding constant value added of the firm and a number of other characteristics that may be correlated with both social networks and transfers made or received by household i. We estimate these regressions for both Samples A and B. Equation (16) is estimated using linear OLS models as well as tobit models, given that 33 (65) percent of all households report not to have made (received) any transfers. We always correct standard errors for intra-cluster correlations. In total there are 558 clusters in Phase 2. To reduce bias due to measurement and reporting errors, we trim the data and drop influential outliers from our sample that we identify by the DFITS-statistic. As suggested by Belsley, Kuh, and Welsch (1980), we use a cutoff-value $|DFITS|_{ihj} > 2\sqrt{k/N}$ with k, the degrees of freedom (plus 1) and N the number of observations. Depending on the estimation, this procedure removes between 25 and 100 observations. Transfers are usually difficult to measure, given their irregular nature and the fact that they are often done in-kind. Hence, trimming the data is important to reduce the problem of downward biased coefficients. Moreover, it must be noted that the sample used in this section is relatively small, because transfers were recorded in Phase 3 of the 1-2-3 surveys, which covers only a (representative) sub-sample of all entrepreneurs surveyed in phase 1 and 2. Moreover and as already said above, Phase 3 was not conducted in Côte d'Ivoire. The results are presented in Table 3. We first focus on transfers given, i.e. columns (1) to (4).

[Table 3 about here]

Before we discuss the coefficients associated with the redistributive pressure variables, we briefly report some of the results for the control variables. Transfers given vary significantly and positively with value added of the firm. For Sample A, whether the linear or tobit model is used, we find an elasticity of about 0.16, i.e. an increase of value added by 10 percent leads on average to an increase of transfers given by about 1.6 percent. Interestingly, this effect is statistically significantly lower if enterprises within households are aggregated, i.e. if we use Sample B. Using the tobit model, the coefficient becomes even insignificant. This suggests that splitting enterprises is an effective strategy to reduce the solidarity tax. This may work, because it is probably easier to hide earnings from the family, if they arise in several small activities instead of one larger clearly visible and observable unit. We find the same effect if we estimate Equation (16) separately for different quantiles of value added. The tax rate increases with value added. And, finally, this effect is also confirmed if we estimate Equation (16) separately for households with one and household with more than one firm. In the latter group, the share transferred out of total value added is smaller than in the former group.

Depending on the sample and the estimation method migrants transfer between 60 percent and 115 percent more than non-migrants. Gender of the entrepreneur, age, household size and ethnicity do not have much influence. Most of these variables are insignificant. Very strong effects are associated with the household's activity portfolio. Households with businesses *and* an employee in the public or private formal sector transfer substantially more than households who have just an informal business (and possibly some other informal dependent wage work outside the household). Country effects are included but not presented in the paper, but we find that transfers are particularly low in Mali and Niger, which are both among the poorest countries in our sample, and particularly high in Senegal, the richest country in our sample.

Now we turn to the role of social networks: the share of fellow ethnic group members in each cluster; the share of the population in the respective cluster that grew up in the same area; and the geographical distance in km to the entrepreneur's area of origin. The results in Table 3 show that, except for column (1), transfers to other households increase significantly with the share of the population of the same ethnic origin in the neighbourhood. A rise in this share by 10 percentage points implies an increase in transfers by about 7 to 10 percent. The share of the population that grew up in the same area is not significant in these regressions. However, as will be seen below, this variable will play an important role in subsequent steps of our analysis. The distance to the area of origin has a significant negative effect in all models. This effect does also hold if the regressions are performed on a sample of migrants only (results not reported). An increase of this distance by 100 percent, say from 100 to 200 km, leads to a decrease of transfers given by about 20 to 25 percent. A longer distance between the entrepreneur and his/her kin in the village of origin hence leads indeed, as hypothesized in Section 2, to lower transfers. Again, this may happen because the longer the distance the higher the costs for the kin to observe the earnings generated by the entrepreneur; or, from the point of view of the entrepreneur, the longer the distance, the easier to hide income from the family. And, again, it may also be that the cost of transferring increases in distance. It is important to note that the effect associated with distance is robust to the inclusion of value added, ethnicity and country effects. Hence, among two entrepreneurs with the same value added, of the same ethnic group in the same country the one who lives closer to his/her kin transfers more resources to other households. Finally, it should be noted that the results are fully consistent with those we obtain if we estimate a probit model using as dependent variable simply a binary response variable that takes the value one if the household made any

transfers and zero otherwise. Using the sub-sample of migrants only, we also tested whether population density and the total fertility rate in the area of origin play any role. However the corresponding coefficients were always insignificant and we drop these proxies for the rest of our analysis.

We now turn to transfers received. The corresponding regressions are presented in columns (5) – (8) in Table 3. The first striking result is that there is no significant association between transfers received and value added. This is also confirmed by a probit model (results not reported). Hence, underperforming entrepreneurs do not get necessarily more support than others from their kin. Migrant status has a negative sign (though not statistically significant when the tobit model is used), showing that migrants usually get less support than non-migrants. It is also interesting, but not surprising, to see that men receive significantly less than women.

The results with regard to the social network proxies are in line with expectations. The amount of transfers received increases significantly with the share of the population of the same ethnic origin in the neighbourhood. A rise in this share by 10 percentage points implies an increase in transfers by about 7.5 to 9.5 percent. The tobit model even suggests an order of magnitude of about 20 percent. This finding mirrors the above finding, as the transfers made should flow to the kin within the clusters. It implies that a higher density of people from the same kin does not only mean that more has to be transferred but that also more can be expected in terms of support. Hence transfers between members of the same kin living in the same neighbourhood seem to be based on reciprocity and mutual support. As above, the share of the population that grew up in the same area is not significant. The distance to the area of origin has a statistically and economically weak positive effect when the OLS model is used and an insignificant effect if the tobit model is used. The OLS results (columns (5) and (6)) imply that a decline of this distance by 50 percent, say from 200 to 100 km, lead to a reduction of received transfers, by about 6 to 7 percent. So the more closely the kin from the village to the entrepreneur, and hence the easier for the kin to observe the entrepreneur's activity, the less likely it is for the entrepreneur to get support.

We conclude from this section, first, that transfers given increase with value added generated by the firm. Second, that the kin-network in the neighbourhood does both, it claims and provides support, suggesting that urban entrepreneurs operate in social networks based on reciprocity. Third, the demands from the village or more generally from the kin in the area of origin decline with distance.

5. Redistributive pressure, capital accumulation, labour demand and the owner's effort level

After having shown that at least two of our social network proxies are significantly associated with transfer activities, we examine whether redistributive pressure and social networks have any negative (or positive) effects on inputs use. We look at three different types of inputs: physical capital, *K*, total number of employed working hours (including those provided by the owner), L_i^T , and working hours provided by the owner alone, L_i^O . Hence, we run the following three regressions:

$$\log K_i = \beta_{K0} + \beta_{K1} P_h + X_{ji}^{'} \beta_{K2} + Z_i^{'} \beta_{K3} + S_i^{'} \beta_{K4} + C_i^{'} \beta_{K5} + \vartheta_{Ki}, \qquad (17)$$

$$\log L_i^T = \beta_{LT0} + \beta_{LT1} P_h + \beta_{LT2} \log K_i + X_{ji}^{'} \beta_{LT3} + Z_i^{'} \beta_{LT4} + S_i^{'} \beta_{LT5} + C_i^{'} \beta_{LT6} + \vartheta_{LTi}, \qquad (18)$$

$$\log L_i^O = \beta_{LO0} + \beta_{LO1} P_h + \beta_{LO2} \log K_i + X'_{ji} \beta_{LO3} + Z'_i \beta_{LO4} + S'_i \beta_{LO5} + C'_i \beta_{LO6} + \vartheta_{Ki}, \qquad (19)$$

All right-hand-side variables have the same meaning as in Equation (16) above. However, in Equations (17) to (19) we now also control for sector effects, S_i, since production technologies are likely to differ between sectors. For instance, petty trade is less capital intensive than most transport services. Moreover, sector choice may, in turn, be correlated with (perceived) redistributive pressure. For Equations (17) to (19), we estimate in each case two different models, one over Sample A and one over Sample B.

In what follows, we discuss the results of each regression starting with the model testing for the effects of forced solidarity on the total stock of physical capital used. The results are shown in Table 4. The first specification uses a simple linear regression model (Columns (1) and (2)). The second specification uses a tobit model (Columns (3) and (4)) to account for the fact that 13.7% of all entrepreneurs do not employ any physical capital.

[Table 4 about here]

The results show that the total capital stock is higher for enterprises owned by men than for women. It increases with age and education of the entrepreneur and it is higher for entrepreneurs who speak French. There are no significant effects associated with other activities in the household, i.e. the capital stock is not significantly higher in households that also have earnings from dependent wage work in the public or private formal sector. Sector effects are highly significant, as expected. Country effects were also included but are not shown here. Overall, the OLS regressions explain about 35 percent of the total variance in observed capital stocks.

With respect to social networks, the corresponding proxies are, with one exception, only significant in columns (2) and (4), i.e. only if we consider the total entrepreneurial capital in a household and not only firm by firm. The total household-level capital stock hence increases with both the share of people from the same ethnic group in the neighbourhood and with the share of people that grew up in the same area. This points to the existence of substantial positive social network effects, such as informal credit, access to markets and other knowledge. For instance, an increase in the share of the population of the same ethnic group by 10 percentage points is associated with a capital stock that is higher by about 3.3 percent. This is about the same effect implied by an increase of 1 percentage point in the share of the population that comes from the same area of origin (the sample mean of this share is 1.6 percent). In contrast, more distant social networks, proxied by the distance to origin, appear to have a negative effect on firm performance. Controlling for migrant status the coefficient of distance proxy is, as in the above regressions, positive, i.e. entrepreneurs with more distant home communities have higher capital stocks. This finding is consistent with a type of social network that represents a burden for the entrepreneur and involves little reciprocity. Distance seems to dilute the ties underlying such networks. The point estimates in columns (2) and (4) suggest for instance that an increase of the distance from 100 to 200 km implies an increase in the accumulated capital stock by 7 to 10 percent, which is a sizeable effect. Migrants have on average a capital stock that is smaller by 37 to 56 percent compared to non-migrants. The effects are qualitatively the same if we estimate the regressions for the sample of migrants only.

The fact that the positive and negative social network effects cannot be recovered when looking at single enterprises may reflect that households build up capital by creating several

firms rather than expanding existing ones. This strategy may have a number of advantages, such as the ease to hide income from tax authorities and risk-mitigating diversification. But it may also allow, as hypothesized above, to make it more difficult for the kin to observe profits and to 'tax' the entrepreneur. It is important to remember that we have shown in Section 4 that the propensity to transfer out of profits was smaller in Sample B than in Sample A.

In sum, the findings so far suggest that entrepreneurs benefit from the presence of the extended family or kin in the city where transfers are based on reciprocity. However, capital accumulation is constrained by the demands from those that stayed in the village, an effect that declines with distance to the origin.

Next, we turn to the regressions that explore the effects of redistributive pressure on the total amount of working hours in the enterprise (Table 5). We find that firms owned by men employ more labour. The use of labour also increases with the age of the owner, and in the size of the capital stock. Note that we introduce a dummy taking the value one if an enterprise uses no physical capital. Migrant status has, as above, a significant negative effect. With respect to social networks, we find the same pattern as above. The effects are only significant when aggregating entrepreneurial activities at the household level. Again, the share of own ethnic group in the cluster of residence has a positive effect, as has the share of the population that grew up in the same area of origin. However, being closer to the area of origin has a significant negative effect.

[Table 5 about here]

Finally, we look at the effects of social networks on working hours provided by the owner alone. Again we find that social networks within the city have a positive impact. And the effects are more pronounced when enterprises are aggregated at the household level. For instance, an increase by 10 percentage points in the share of the population of the same ethnic group in the neighbourhood increases the owner's labour hours by about 1.3 percent, which corresponds at the sample mean to about 3.2 hours per month. Or, if the share of the population from the same area of origin increases by 1 percentage point, working hours increase by 0.8 percent or 2 hours at the sample mean. These are quite moderate effects, but they probably occur at the margin. Entrepreneurs with access to social networks may benefit from higher demand and more opportunities. Reciprocity is also likely to play a role here. Geographical closeness to the kin in the area of origin in turn decreases the effort level. For instance, a decrease in the distance by 100 percent, decreases labour hours provided by the owner by about 5.3 percent or 13 hours at the sample mean. Hence, an entrepreneur who is exposed to strong sharing obligations may deny an additional order towards the end of the month, if he or she feels that the return would anyway need to be shared with the extended family. Migrants provide on average between 25 and 30 percent less hours to their firms than non-migrants. Again, all effects are robust to estimating the model for the sample of migrants only.

6. Redistributive pressure and enterprise performance

In this section we test whether the effects of social networks identified in Section 5 are also reflected in firm performance beyond input use. We measure firm performance more broadly by the value added, *VA*, and estimate the following regression:

$$\log VA_i = \beta_{VA0} + \beta_{VA1} P_h + \beta_{VA2} \log K_i + \beta_{VA3} \log L_i^T + X'_{ji} \beta_{VA4} + Z'_i \beta_{VA5} + S'_i \beta_{VA6} + C'_i \beta_{VA7} + \vartheta_{VAi}, \quad (20)$$

where all symbols have the same notation than above. Table 6 shows the results. In column (1) and (2) we exclude from the list of explanatory variables the physical capital stock and the total hours of labour employed, since these effects should be (partly) captured by our social network capital variables for which we have shown that they determine largely the allocation of factors to the production process. In column (3) and (4) then, we add capital and labour and expect that the effects of social networks are attenuated.

In column (1) and (2), we find significant effects for the share of the population from the same area of origin and for the distance variable. However, the share of the cluster population from the same ethnic group is insignificant. Migrant status has a significant negative effect (-25 to 53 percent). If we add physical capital and labour to the list of regressors (columns (3) and (4)), the effects of social networks are indeed mitigated. Only the distance variable remains significant, but in column (4) with a smaller coefficient than in column (2). These findings hence suggest that the effects of social networks (both negative and positive) run through the accumulation of capital and the use of additional production factors, here labour.

[Table 6 about here]

With respect to the control variables, we find that value added is on average higher for men than for women. Speaking French and having higher education is also positively correlated with value added. The returns to capital (15 percent) and labour hours (40 percent to 50 percent) show plausible magnitudes for the given context. Returns do not much differ whether estimated over Sample A or B. Value added increases in the age of the enterprise with each year adding 1.5 percent to the total. There is no significant correlation with the activity portfolio of the household, except that the category 'other', which is a residual category including less than one percent of all households, has a significantly reduced value added compared to the rest. The regressions in columns (3) and (4) explain about 37 percent to 40 percent of the total variance in value added.

7. Redistributive pressure and technical efficiency

After having focused on allocative efficiency, we now have a brief look at technical efficiency (Fried, Lovell and Schmidt, 2008). The question asked here is whether social networks also affect the enterprise's technical efficiency, i.e. whether even after having efficiently allocated inputs entrepreneurs would use them in a suboptimal way. Inefficiency (or efficiency, depending on the sign considered) is usually defined as the distance which separates the firm's frontier of outputs from the observed realization of outputs given the entrepreneur's and firm's observed characteristics. Social network capital may or may not help to operate efficiently. Entrepreneurs that are confronted with strong pressure for redistribution may produce less efficiently and realize a lower output than they in principle could with the same amount of resources. By contrast, positive effects of social network capital on technical efficiency might be expected if the entrepreneur's social network acts as a positive externality on his/her activity. For example, the entrepreneur may be subject to knowledge spillovers when starting the business, i.e. exposed to the diffusion of management skills amid the kin network.

We thus estimate stochastic frontier production functions that are the production possibility frontiers for a given set of inputs (see Kumbhakar and Lovell, 2000; Greene, 2008). The error components model is formulated as:

$$\log VA_i = \beta_{FR0} + \beta_{FR1} \log K_i + \beta_{FR2} \log L_i^T + X'_{ji}\beta_{FR3} + Z'_i\beta_{FR4} + S'_i\beta_{FR5} + C'_i\beta_{FR6} + \nu_{FRi} - u_{FRi}, \quad (21)$$

where K, L^T, X, Z, S, C are the set of observed characteristics discussed in the previous sections. ν_{FRi} is assumed to be a iid N(0, σ_v^2) random error. u_{FRi} is assumed to be iid as truncations on the left at zero. A common way to estimate this one-sided error model is to specify a distribution for u_{FRi} and then to allow the parameters of that distribution to depend on a set of characteristics which are deemed to influence the firms' efficiency. Usual assumptions for the distribution of the one-sided error term are the half-normal or exponential distributions. We tried both, which lead to similar qualitative results; and finally opted for the exponential distribution as it generally provided a better adjustment. There are several approaches to estimating the inefficiency models. These may be estimated with either a one-step or a two-step process. For the two-step procedure, the one that we follow here for the sake of simplicity,[11] the production frontier is first estimated and the technical efficiency of each enterprise is derived. These technical efficiencies are subsequently regressed against the set of variables P_h, our proxies of redistributive pressure, which are assumed to influence the enterprises' efficiency.

The results of the second step technical efficiency OLS regressions are reported in Table 7. Again we use both samples (A and B) for estimation.

[Table 7 about here]

The results show that the coefficient associated with the share of the population that belongs to the same ethnic group is generally negative and insignificant in most regressions. By contrast, the share of the population that grew up in the same area has a significant and positive effect on technical efficiency in column (1), but not in column (2), i.e. if enterprises within households are aggregated. Finally, we observe no significant effect associated with the distance to the entrepreneur's area of origin on technical efficiency.

8. Conclusion

In this paper, we have explored the potential negative effects of social networks that may arise through forced solidarity and redistributive pressure. Anecdotic evidence suggests that such pressure can be important and create substantive disincentives to engage in economic activity. We develop a household model, in which households consume and pursue different income generating activities, mainly the production of goods and services and the engagement in dependent wage work outside the household. Value added of the household business is subject to a solidarity tax imposed by the household's kin-group. We assume that the size of this tax depends on the distributional norms prevailing in the relevant kin group, the size of the kin, the costs for the kin to observe the enterprise's profit and possibly on the productivity of the firm. The model implies that with an increasing tax, fewer resources will be allocated to the household business.

Based on these considerations and using an original data set of West-African entrepreneurs, we test these hypotheses. To measure redistributive pressure we rely on three variables: the

[11] The one-step approach consists of maximizing a likelihood function. For our purpose, the two-step approach is convenient as we are essentially interested in the sign and significance of the second step coefficients, not their magnitude (see Wang and Schmidt, 2002).

share of fellow ethnic group members in each cluster; the share of the population in a cluster that grew up in the same area; and the geographical distance to the entrepreneur's area of origin. To avoid endogeneity problems, it is crucial to focus on potential pressure and not on actual pressure, which would be reflected in actually paid transfers or the number of non-relatives in the household. We show that our proxies are indeed correlated with actual transfers, conditional on value added generated by the household firm.

In a next step, we have examined the effects of social networks on the employment of production factors – physical capital, total labour hours and the owner's labour – and on value added directly. We find in all cases that local social networks in the city have positive effects on the use of resources and value added and even on technical efficiency. Hence, these network relationships seem to be two-sided, as suggested by many papers in the social networks literature and overall be beneficial, because networks probably provide access to finance, knowledge, jobs and housing. In contrast, we find a robust negative effect on accumulated capital and labour input (and hence value added) associated to smaller distances to the area (or village) of origin, controlling for migrant status. We also show that migrants transfer substantial amounts back to their village, but with rising distance less is transferred. We interpret this effect as evidence that these transfers may be partly involuntary, or at least non-reciprocal. For an entrepreneur with greater distance to his or her home village, it seems easier to hide income and to protect it from abusive demands. Moreover, we find evidence in our data that households transfer less out of profits if they split up their enterprises. Again it might be easier to hide income that is generated by several small activities (often at different locations) compared to income that arises in one larger clearly visible enterprise.

Taken together, we can conclude that many enterprises in Sub-Saharan Africa may fail to grow because of a lack of local social network capital and abusive requests from the villagers left behind. Obviously, one should be careful to draw direct policy implications from these findings but offering more alternative formal support mechanisms that can help if social networks are lacking and implementing or expanding existing basic support systems, in particular insurance against basic risks, may reduce the necessity for inter-household transfers and make it easier for entrepreneurs to save and to invest. Of course these aspects need further research and are beyond the scope of this paper. We end with another word of caution. This paper should be seen as an attempt to conceptualize the positive and negative effects of social networks in the context of African entrepreneurs. The empirical evidence, although fully consistent with our theoretical considerations, is based on cross-sectional data, which obviously makes it difficult to deal with unobserved heterogeneity; a problem that may be particularly important in our context.

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Tables

Table 1: Descriptive statistics

	Sample A		Sample B	
	Mean	S.D.	Mean	S.D.
Owner characteristics				
Male (=1)	0.500	0.500	0.526	0.499
Age owner	36.3	11.5	36.7	11.4
Speaks French (=1)	0.476	0.499	0.484	0.500
No diploma	0.689	0.463	0.680	0.467
Primary completed	0.200	0.400	0.205	0.404
Some secondary	0.053	0.224	0.055	0.229
Other post primary	0.058	0.234	0.060	0.237
Ethnic group 1	0.410	0.492	0.402	0.490
Ethnic group 2	0.203	0.402	0.211	0.408
Ethnic group 3	0.098	0.298	0.097	0.296
Migrant (=1)	0.447	0.497	0.452	0.498
Household characteristics				
Household size	6.9	4.8	6.3	4.3
Only informal firm	0.796	0.403	0.806	0.396
Public wage earner	0.103	0.304	0.096	0.295
Private formal wage earner	0.095	0.293	0.090	0.287
Other combination	0.007	0.082	0.008	0.090
Firm characteristics				
Age of firm	8.055	8.637	8.228	8.664
Clothing and apparel	0.108	0.310	0.104	0.305
Other manufact. and food	0.158	0.364	0.159	0.365
Construction	0.075	0.264	0.080	0.272
Wholesale/retail shops	0.101	0.301	0.103	0.305
Petty trading	0.274	0.446	0.263	0.440
Hotels and restaurants	0.063	0.242	0.063	0.243
Repair services	0.057	0.232	0.059	0.236
Transport	0.046	0.210	0.050	0.218
Other services	0.119	0.323	0.119	0.323
Ann. VA in intl.$ PPP	5370.3	22675.2	6374.0	25218.8
Monthly hours owner	201.5	99.3	244.7	176.2
Total monthly hours	337.6	336.4	408.3	408.5
Total staff incl. owner	1.6	1.2	1.9	1.6
Hired paid staff	0.2	0.8	0.2	0.8
No physical capital (=1)	0.138	0.345	0.121	0.326
Physical. cap. in intl. $ PPP	1004.0	3818.1	1219.3	4313.0
Physical cap. (lowest 33%)	8.3	8.7	11.9	12.1
Physical cap. (middle 33%)	96.0	59.9	138.3	84.8
Physical cap. (highest 33%)	2909.7	6189.5	3508.6	6925.1
No. of firms			1.2	0.5
Country				
Benin	0.142	0.349	0.148	0.355
Burkina Faso	0.148	0.355	0.143	0.350
Cote d'Ivoire	0.151	0.358	0.152	0.359
Mali	0.149	0.356	0.147	0.354
Niger	0.113	0.317	0.118	0.322
Senegal	0.153	0.360	0.143	0.350
Togo	0.145	0.352	0.150	0.357
N	6580		5440	

Source: 1-2-3 surveys, WAEMU, 2001/02.

Table 2: Proxies of the intensity of social networks and redistributive pressure

	Sample A		Sample B	
	Mean	S.D.	Mean	S.D.
Total sample				
Share same ethnic group	0.384	0.276	0.382	0.274
Share same origin	0.016	0.035	0.017	0.035
Distance to origin	77.3	141.5	83.6	147.1
N	6580		5440	
Migrants only sample				
Distance to origin	172.8	168.1	175.6	171.1
Pop. density at origin	308.3	558.9	314.9	564.1
Total fertility rate at origin	5.9	1.1	5.9	1.1
N	2960		2590	

Source: 1-2-3 surveys, WAEMU, 2001/02.

Table 3: The effect of social networks on transfers made and transfers received

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Transfers made				Transfers received			
	OLS		Tobit		OLS		Tobit	
	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
Share same ethnic group	0.705	0.730*	0.984*	1.022*	0.952**	0.770**	1.949**	1.559
	(0.448)	(0.405)	(0.514)	(0.566)	(0.410)	(0.381)	(0.887)	(0.967)
Share same origin	-0.236	2.747	-0.009	3.060	-0.248	-1.754	-1.025	-4.371
	(2.822)	(2.682)	(4.413)	(4.594)	(2.977)	(2.844)	(7.670)	(7.949)
Ln distance to origin	-0.216***	-0.194***	-0.265**	-0.215**	0.129*	0.132**	-0.024	0.101
	(0.075)	(0.058)	(0.119)	(0.102)	(0.066)	(0.059)	(0.212)	(0.174)
Ln value added	0.156***	0.113***	0.156***	0.093	0.022	-0.006	-0.070	-0.105
	(0.041)	(0.041)	(0.060)	(0.061)	(0.039)	(0.039)	(0.104)	(0.103)
Male (=1)	0.046	0.061	0.022	0.097	-0.270*	-0.363**	-0.478	-0.508
	(0.153)	(0.169)	(0.245)	(0.269)	(0.155)	(0.172)	(0.426)	(0.458)
Age owner	0.001	-0.004	0.002	-0.006	0.012*	0.012	0.032*	0.027
	(0.007)	(0.007)	(0.010)	(0.012)	(0.007)	(0.008)	(0.018)	(0.020)
Migrant (=1)	0.868**	0.610**	1.136*	0.732	-0.708**	-0.674**	-0.156	-0.752
	(0.361)	(0.273)	(0.585)	(0.500)	(0.334)	(0.318)	(1.041)	(0.853)
Household size	0.047*	0.022	0.060**	0.045	0.007	0.038	0.050	0.121**
	(0.025)	(0.023)	(0.028)	(0.034)	(0.026)	(0.023)	(0.049)	(0.058)
Ethnic group 1	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Ethnic group 2	-0.180	-0.048	0.019	0.085	-0.372	-0.152	-0.824	-0.306
	(0.268)	(0.256)	(0.368)	(0.397)	(0.250)	(0.252)	(0.644)	(0.680)
Ethnic group 3	0.133	0.008	0.180	-0.043	0.074	0.005	0.626	0.575
	(0.321)	(0.312)	(0.433)	(0.479)	(0.285)	(0.284)	(0.745)	(0.813)
Only informal firm	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Public wage earner	0.961***	1.102***	0.960**	1.166***	0.110	-0.147	0.504	0.225
	(0.281)	(0.272)	(0.382)	(0.419)	(0.298)	(0.285)	(0.665)	(0.715)
Private formal wage earner	0.839**	1.072***	0.707*	1.043**	0.324	-0.032	0.888	0.320
	(0.359)	(0.314)	(0.430)	(0.484)	(0.354)	(0.309)	(0.729)	(0.813)
Other combination	0.198	0.087	0.578	0.470	1.740***	1.412***	1.008	0.734
	(0.700)	(0.637)	(1.371)	(1.386)	(0.346)	(0.320)	(2.343)	(2.334)

Table 3: (… *continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Transfers made				Transfers received			
	OLS		Tobit		OLS		Tobit	
	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
…								
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	2.669***	3.049***	1.659**	2.159***	1.337***	1.388***	-2.499**	-2.345*
	(0.477)	(0.497)	(0.701)	(0.743)	(0.498)	(0.500)	(1.210)	(1.265)
R-squared	0.136	0.113			0.100	0.101		
N	1436	1204	1470	1237	1422	1197	1470	1237

Notes: Robust standard errors in parentheses (clustered at the segment level). * p<0.10, ** p<0.05, *** p<0.01
Source: 1-2-3 surveys, WAEMU, 2001/02.

Table 4: The effect of social networks on the use of physical capital

	(1)	(2)	(3)	(4)
	OLS		Tobit	
	Sample A	Sample B	Sample A	Sample B
Share same ethnic group	0.046	0.330***	0.020	0.363**
	(0.123)	(0.122)	(0.143)	(0.156)
Share same origin	1.367*	3.291***	1.246	2.807**
	(0.744)	(0.869)	(1.100)	(1.192)
Ln distance to origin	-0.010	0.070***	-0.016	0.101***
	(0.022)	(0.020)	(0.032)	(0.029)
Male (=1)	1.140***	1.067***	0.981***	0.935***
	(0.065)	(0.073)	(0.077)	(0.084)
Age owner	0.021***	0.013***	0.020***	0.012***
	(0.003)	(0.003)	(0.003)	(0.004)
Speaks French (=1)	0.472***	0.532***	0.498***	0.534***
	(0.069)	(0.075)	(0.086)	(0.094)
No diploma	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Primary completed	0.244***	0.151*	0.182*	0.098
	(0.078)	(0.086)	(0.099)	(0.108)
Some secondary	0.465***	0.349***	0.215	0.086
	(0.128)	(0.133)	(0.155)	(0.167)
Other post primary	0.618***	0.571***	0.295*	0.226
	(0.131)	(0.138)	(0.156)	(0.166)
Ethnic group 1	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Ethnic group 2	0.134*	0.046	0.113	0.072
	(0.077)	(0.081)	(0.096)	(0.104)
Ethnic group 3	0.163*	0.221***	0.092	0.153
	(0.086)	(0.085)	(0.110)	(0.121)
Migrant (=1)	0.049	-0.373***	0.049	-0.560***
	(0.108)	(0.101)	(0.160)	(0.144)
Age of firm	0.002	0.007*	0.004	0.008*
	(0.003)	(0.004)	(0.004)	(0.005)
Only informal firm	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Public wage earner	0.091	0.081	-0.002	0.024
	(0.087)	(0.095)	(0.110)	(0.122)
Private formal wage earner	0.129	0.105	0.108	0.114
	(0.083)	(0.093)	(0.112)	(0.125)
Other combination	-0.173	-0.433*	-0.435	-0.670*
	(0.219)	(0.234)	(0.393)	(0.390)
Constant	4.740***	5.090***	4.681***	4.971***
	(0.160)	(0.170)	(0.188)	(0.206)
Sector effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes
R-squared	0.355	0.345		
N	6132	5054	6503	5385

Notes: Robust standard errors in parentheses (clustered at the segment level). * p<0.10, ** p<0.05, *** p<0.01
Source: 1-2-3 surveys, WAEMU, 2001/02.

Table 5: The effect of social networks on used labour input (OLS)

	(1)	(2)	(3)	(4)
	Ln total labour hours		Ln total hours owner	
	Sample A	Sample B	Sample A	Sample B
Share same ethnic group	-0.015	0.101**	-0.016	0.127***
	(0.040)	(0.043)	(0.030)	(0.032)
Share same origin	0.513	0.900***	0.046	0.787***
	(0.316)	(0.323)	(0.201)	(0.259)
Ln distance to origin	0.008	0.035***	0.014**	0.053***
	(0.008)	(0.007)	(0.007)	(0.006)
Ln physical capital	0.163***	0.181***	0.042***	0.065***
	(0.006)	(0.006)	(0.004)	(0.004)
No capital	0.420***	0.448***	0.063**	0.098***
	(0.038)	(0.041)	(0.028)	(0.031)
Male (=1)	0.287***	0.293***	0.221***	0.239***
	(0.021)	(0.024)	(0.015)	(0.018)
Age owner	0.003***	0.001	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Speaks French (=1)	-0.023	-0.028	-0.026	-0.032*
	(0.024)	(0.026)	(0.017)	(0.019)
No diploma	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Primary completed	-0.042	-0.052*	-0.016	-0.031
	(0.028)	(0.032)	(0.019)	(0.023)
Some secondary	0.013	0.069	-0.021	-0.020
	(0.045)	(0.045)	(0.031)	(0.033)
Other post primary	-0.191***	-0.177***	-0.167***	-0.203***
	(0.049)	(0.054)	(0.035)	(0.040)
Ethnic group 1	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Ethnic group 2	-0.023	-0.023	-0.006	-0.010
	(0.028)	(0.030)	(0.020)	(0.022)
Ethnic group 3	0.082***	0.101***	0.064***	0.059**
	(0.030)	(0.032)	(0.021)	(0.024)
Migrant (=1)	-0.098**	-0.235***	-0.089***	-0.304***
	(0.041)	(0.036)	(0.033)	(0.031)
Age of firm	0.003***	0.004***	0.002**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Only informal firm	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Public wage earner	-0.086***	-0.065*	-0.030	-0.003
	(0.030)	(0.033)	(0.022)	(0.027)
Private formal wage earner	-0.052*	-0.068*	0.015	0.012
	(0.030)	(0.035)	(0.021)	(0.028)
Other combination	-0.349***	-0.437***	-0.284***	-0.383***
	(0.067)	(0.071)	(0.067)	(0.064)
Sector effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes
Constant	4.467***	4.469***	4.876***	4.795***
	(0.064)	(0.068)	(0.045)	(0.052)
R-squared	0.291	0.325	0.153	0.194
N	6226	5158	6143	5093

Notes: Robust standard errors in parentheses (clustered at the segment level).
* p<0.10, ** p<0.05, *** p<0.01
Source: 1-2-3 surveys, WAEMU, 2001/02.

Table 6: The effect of social networks on value added (OLS)

	(1) Sample A	(2) Sample B	(3) Sample A	(4) Sample B
Share same ethnic group	-0.104	0.106	-0.071	0.012
	(0.092)	(0.097)	(0.085)	(0.088)
Share same origin	1.418***	1.778***	1.189**	0.706
	(0.524)	(0.609)	(0.483)	(0.542)
Ln distance to origin	0.020	0.077***	0.021	0.038***
	(0.018)	(0.015)	(0.016)	(0.014)
Ln physical capital			0.159***	0.149***
			(0.011)	(0.012)
No capital			0.438***	0.414***
			(0.071)	(0.081)
Ln total labour hours			0.426***	0.519***
			(0.021)	(0.023)
Male (=1)	0.734***	0.741***	0.392***	0.363***
	(0.040)	(0.046)	(0.039)	(0.043)
Age owner	0.007***	0.005**	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Speaks French (=1)	0.220***	0.256***	0.139***	0.123***
	(0.046)	(0.052)	(0.040)	(0.047)
No diploma	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Primary completed	0.082	0.053	0.040	0.049
	(0.051)	(0.058)	(0.047)	(0.053)
Some secondary	0.339***	0.344***	0.245***	0.276***
	(0.080)	(0.091)	(0.073)	(0.084)
Other post primary	0.315***	0.336***	0.354***	0.337***
	(0.090)	(0.101)	(0.080)	(0.085)
Ethnic group 1	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Ethnic group 2	0.027	0.014	0.043	0.016
	(0.050)	(0.055)	(0.046)	(0.051)
Ethnic group 3	0.100*	0.087	0.050	0.015
	(0.056)	(0.064)	(0.054)	(0.058)
Migrant (=1)	-0.257***	-0.525***	-0.248***	-0.308***
	(0.089)	(0.079)	(0.078)	(0.070)
Age of firm	0.018***	0.020***	0.015***	0.014***
	(0.002)	(0.003)	(0.002)	(0.002)
Only informal firm	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Public wage earner	-0.102*	-0.119*	-0.056	-0.085
	(0.060)	(0.067)	(0.053)	(0.059)
Private formal wage earner	0.035	0.053	0.059	0.050
	(0.057)	(0.066)	(0.053)	(0.058)
Other combination	-0.747***	-1.162***	-0.425***	-0.628***
	(0.135)	(0.180)	(0.129)	(0.148)
Sector effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes
Constant	5.995***	6.144***	3.008***	2.659***
	(0.116)	(0.134)	(0.153)	(0.176)
R-squared	0.248	0.248	0.374	0.400
N	6022	5058	6019	5038

Notes: Robust standard errors in parentheses (clustered at the segment level). * p<0.10, ** p<0.05, *** p<0.01
Source: 1-2-3 surveys, WAEMU, 2001/02.

Table 7: Social networks and technical efficiency (OLS)

	(1) Sample A	(2) Sample B
Share same ethnic group	-0.006	0.008
	(0.011)	(0.013)
Share same origin	0.159*	0.016
	(0.083)	(0.094)
Ln distance to origin	-0.001	0.001
	(0.001)	(0.001)
Sector effects	Yes	Yes
Country effects	Yes	Yes
Constant	0.423***	0.384***
	(0.011)	(0.016)
R-squared	6288	5323
N	0.008	0.008

Notes: Robust standard errors in parentheses (clustered at the segment level). First step frontier production functions are estimated using an exponential distribution of the one-sided efficiency term. *** p<0.01, ** p<0.05, * p<0.1
Source: 1-2-3 surveys, WAEMU, 2001/02.