Measuring entrepreneurs' social networks and their economic impact in an informal African urban economy

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Abstract

Social relations and networks constitute a major form of social regulation in informal African urban economies. Their nature, configuration and impact on economic performance of entrepreneurs constitute a crucial issue for understanding the dynamics of informal urban economies. To explore the subject, this paper focuses on social or personal network of entrepreneurs rather than inter-firm ties. Observed networks circumvent the usual frontiers of social institutions and categories. We suggest a methodological approach based on the notion of 'ego-centred' network taken from the Social Network Analysis research tradition. This approach helps to assess social networks according to three salient dimensions: network structure (size, density), content of ties (strength, social role, exchanged resources), and member attributes (sociodemographic, social status, professional occupation). From an empirical standpoint, we use an original dataset collected in 2007 on a representative sample of 317 entrepreneurs in the informal economy of Bobo-Dioulasso (Burkina Faso). The instrument of 'multiple name generators' implemented to collect ego-centred network data generated a rich set of information for describing the configuration of social networks. Quantitative measures of the structure and composition of networks helps to devise a well-informed typology of the social networks of entrepreneurs. It suggests that significantly different kinds of networks are observable. Each network clearly has a differentiated impact on economic performance. Multiple regression analysis shows that linking networks with members enjoying privileged social status has no significant impact on the economic performance of entrepreneurs. Conversely, solidarity networks and business networks have a strong and significant positive impact. All things considered, empirical results reveal the importance for small urban informal entrepreneurs of drawing on both embedded social relations and autonomous relations. The importance of business ties and business networks underlines the need for institutions that encourage equitable forms of interaction between entrepreneurs.

1. Introduction

Conceived as an extremely heterogeneous collection of activities partly conducted on the fringes of state rules, informal economies have undergone a rapid expansion in developing countries over the last decades, especially in Sub-Saharan African cities, where they contribute on average 61% of urban employment (Xaba and al., 2002:3). In this context, understanding informal economic dynamics constitutes a crucial issue for policy intervention. One little-known aspect of these dynamics is the role of social networks as a major form of social regulation.

The role of social networks in markets and economic action, outcomes and institutions is recognized and has been studied for decades by social scientists, especially sociologists (Granovetter, 1985; Coleman, 1988). Economists have also recently begun to address this issue, particularly by demonstrating the role of non-market institutions as social networks in

market efficiency (reduction of transaction costs and contract enforceability; Greif, 1993, Kranton, 1996). In African societies, the nature and role of social networks, particularly wide trading networks from pre-colonial to contemporary periods, have been widely studied by anthropologists, historians and sociologists (Mitchell, 1969; Meillassoux, 1971). In the current framework of informal urban economies, and in the African context of state failure and modern institutional failure, social networks and personal relations inevitably play an important part in structuring economic activities. Indeed, they may facilitate access to a variety of useful resources for entrepreneurs, including information, ideas and knowledge (about markets, activities, and skills) or financial and material support (especially in times of crisis). In the case of informal activities, it is of special importance since it compensates for the weakness of the internal resources of small firms.

From an economic standpoint, the study of contemporary social networks in urban entrepreneurship and informal economies has been developed using two interrelated perspectives (Barr, 2002; Knorringa and van Staveren, 2006). The first relates to the analysis of inter-firm networks in industrial sectors or clusters in developing countries (McCormick, 1999; Brautigam, 1997, Meagher, 2007). The second rests on social capital literature and focuses on social networks of entrepreneurs. It attempts to evaluate their nature, role and impact on entrepreneurial success and economic performance. Yet surprisingly, this perspective remains relatively undeveloped, since most of the empirical literature that examines individual social capital in developing countries focuses on households rather than entrepreneurs (see Durlauf and Fafchamps, 2004). Furthermore, the concept of social capital does not exclusively refer to social networks, but also relates to social norms and trust. Nevertheless, as Durlauf and Fafchamps (2004: 46, 57) argue, it may be more fruitful for empirical analysis to 'step back from grandiose approaches' and to focus on some specific social components of social capital, such as social networks. This is the reason why our approach is firmly rooted in this second perspective and specifically focuses on social networks[1]. However, another important difficulty of this perspective, which may account for the relative lack of empirical investigations, is the measurement and collection of relevant exploitable data on social networks.

Our paper contributes to the economic literature on the social networks of entrepreneurs by analyzing and evaluating their economic impact in the informal economy of Bobo-Dioulasso (the second largest city in Burkina Faso). More specifically, it challenges one of the main methodological difficulties raised by the measurement and data collection of social networks. We suggest an approach based on the notion of 'ego-centred network' taken from the Social Network Analysis (SNA) research tradition (Wasserman and Faust, 1994; Scott, 2000). An 'ego-centred' (or 'personal') network is defined as one actor's set of connections with others (Wellman, 2007a). This perspective is particularly relevant for studying the social networks of informal entrepreneurs, which are often composed of a blend of business, friend and kin ties. A network is defined as an entrepreneur's regular social relations conveying essential resources for the current exploitation of their activity. This approach enables a description of the configuration of social networks according to three salient dimensions: network structure (size, density), the content of ties (strength, social role, exchanged resources), and members attributes (sociodemographic, social status, professional occupation). Since it necessitates specific personal network data (Wellman, 2007b), we conducted an original survey on a representative sample of 317 entrepreneurs in Bobo-Dioulasso between February and July 2007. In addition to socio-demographic and economic data, personal networks data were

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[1] In addition, because of a degree of conceptual vagueness, the coexistence of multiple definitions, and intense debate in the literature concerning the concept of 'social capital' (Durlauf and Fafchamps, 2004), we will only refer to the notion of 'social network' in our approach.

collected on a sub-sample of 278 entrepreneurs. This part of the questionnaire is based on an adaptation of the multiple names generators method (Fischer, 1982; Burt, 1984; Campbell et Lee, 1991; Marsden, 2005). The explanatory power of this approach rests on its ability to produce rich statistical information concerning the complex nature of informal entrepreneur' networks in relation to the three dimensions referred to above. Quantitative measures of the composition and structure of networks are then computed. They help to produce a well-informed typology of entrepreneurs' social networks, which can be used to test and discuss the relevance of the configuration of networks as a predictor of entrepreneurs' economic outcomes.

The remainder of the paper is organized as follows. Following a brief overview of the measurement issues raised by social networks in the literature about African informal economies, section 2 presents the ego-centred network framework. Section 3 reviews the alleged impact of the three dimensions of ego-centred networks on the economic performance of entrepreneurs and firms. Data, survey methodology, particularly the multiple names generators instrument, and measurement options are discussed in section 4. Section 5 provides a typology of the social networks of entrepreneurs and assesses the potential effects of the different configurations of networks on the outcomes of informal entrepreneurs. Finally, discussion and concluding remarks are presented in section 6.

2. Entrepreneurs' social networks in an African informal economy: a framework for measurement

Inter-firm networks vs. entrepreneurs' social networks

There are two interrelated strands in the economic literature about social networks and African entrepreneurship (Barr, 2002; Knorringa and van Staveren, 2006). The first concerns inter-firms networks and seeks to analyze the role of industrial clusters in African industrialization and development. It questions in particular the significant lack of industrial clusters in Africa (McCormick, 1999). The core idea is that clusters or inter-firms networks in industrial sector may enable micro and small enterprises (MSE) to overcome growth constraints through so-called 'collective efficiency'. One dimension of collective efficiency, i.e. 'active' or 'planned' efficiency, rests on firm ties and entrepreneurial networks. Nadvi and Schmitz (1994) argue that collective efficiency in clusters depends on dense cooperative networks embedded in local socio-cultural relations. For example, Brautigam (1997, 2003) demonstrates the positive role of ethnic business networks in the industrial dynamics of Nigeria and Mauritius. Conversely, Meagher (2006, 2007) stresses that in times of economic crisis, increasing competition and state neglect, social networks and their organizational capacity tend to be disintegrated or fragmented. She adds that such effects may lead to the collapse of entire industrial clusters in African informal economies, such as in the garment and shoe clusters of the Igbo communities of Aba (Nigeria). By exploring the role of entrepreneurs' social networks as a possible support of industrial sectors and clusters, a connection is made with the second strand of the literature that focuses on social capital. Here an attempt is made to identify and analyze the nature and types of networks in which entrepreneurs are embedded (not only for clustered enterprises). The aim here is to evaluate their role and impact on entrepreneurial success and economic performance (Fafchamps and Minten, 2002a, b; Barr, 2002). From an empirical standpoint, this research generally suggests that social networks have a strong and significant positive effect on entrepreneurs' economic outcomes (Fafchamps and Minten, 2002a, b). Whereas the first approach is mostly based on sectoral level analysis and relies on qualitative surveys, the second produces quantitative measures of individual firms or entrepreneurs' social networks.

*The problem of measuring entrepreneurs' social networks*

Two main measures of social networks have been proposed in the framework of social capital literature. It is common to use entrepreneurs' membership in various organizations, groups, clubs and communities (such as business communities or ethnic groups; see Fafchamps, 2000; Knorringa and van Staveren, 2006). However, these measures are likely to overlook the less formalized relations developed outside organizations and social groups, which play an important role, especially in the formation of trust (Lyon, 2000). Yet the main function of social networks is precisely to go through frontiers of institutions and constituted groups. As suggested by Mitchell (1969:49): 'Social networks ramify across and between institutions'. Moreover, membership of identity-communities (such as ethnic groups) is also problematic in contemporary urban Africa. Economic pressure and urbanization tend to encourage the decoupling of interpersonal relations, within and outside communities, and to favour the development of more personalized networks (Lourenço-Lindell, 2002; Meagher, 2006). Consequently, the second measure focuses on entrepreneurs' inter-personal relationships, and especially business relationships (Fafchamps and Minten, 2001, 2002a, b; Barr, 2002). It is, in concrete terms, based on the number of social links which a firm owner maintains with some category of agents in the market sphere (number of suppliers, customers, and other traders known personally, see Fafchamps and Minten, 2002a, b), and sometimes outside the market sphere (such as relations with privileged social categories, including bankers, public servants or politicians; see Barr, 2002). Even though these studies provide very useful general insights into social networks and African MSE dynamics (see section 3), we consider that this research still rests on unconvincing proxies for entrepreneurs' social networks. Three major flaws shall be considered. First, the focus on the 'number' of contacts may remove personal relations from their social context. These measures essentially depend on network size and provide very little qualitative information about the complex nature of social ties and network structure. Of course, the social group of contacts provides some information, but herein lies the second limit. These categories are pre-defined and it is thus quite risky to predict what type of social group is useful for entrepreneurs before having demonstrated it. In addition, important ties maintained by entrepreneurs outside these categories could potentially be overlooked[2]. This method may be unsuitable for capturing the multidimensional nature of an entrepreneur's network. The last point concerns the definition of social relation. To 'know' someone does not necessarily mean that the entrepreneur can obtain resources from this person when necessary. It is merely a 'potential' social support tie. Moreover, to 'know' someone is not an unequivocal criterion and it is likely to be interpreted quite differently by different entrepreneurs. Obviously, as Lyon (2000: 677) underlines, an informal network cannot be easily quantified. As a result, we suggest that in order to produce richer and more relevant quantitative measures of an entrepreneurs' social network, it may be fruitful for economists to seek inspiration from the social network analysis (SNA) tradition developed within sociology (as suggested by Rauch and Hamilton, 2001), and to use the resulting methodological toolkit.

Entrepreneurs' ego-centred network framework

The use of SNA to study economic action, outcomes and institutions developed considerably since Granovetter's (1985) seminal paper on 'structural embeddedness'. SNA is founded on the legacy of different research traditions, but was the first to formalize the notion of social

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[2] For example, Barr (2002) asked entrepreneurs how many of their contacts they would expect to receive help from in times of crisis. Perhaps one could answer 'none of them!' But in fact they may receive help from another person who does not belong to any of the predefined categories. This method therefore overlooked important ties that enable an entrepreneur to face a crisis and to maintain their business.

Figure 1: **Configurations of entrepreneur's personal network and economic outcomes**
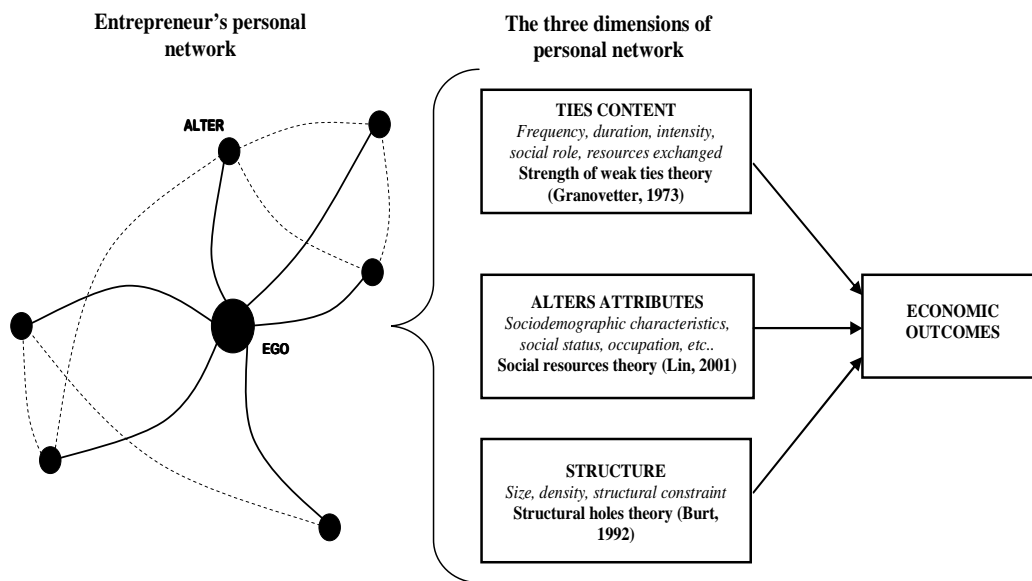
network using a quantitative approach (Wasserman and Faust, 1994; Scott, 2000). Generally speaking social relations between individuals are commonly viewed in this framework as inter-personal experience (every agent knows every other agent's relevant characteristics) based on interactions that enable the transmission of resources. A social network is merely conceived as the aggregation of social relations. SNA is founded on two methodological corpuses. In the first corpus, a social network is defined from a socio-centred standpoint as a finite set of actors and the relations between them (Wasserman and Faust, 1994: 20). It is called 'whole' or 'complete' networks[3]. The second corpus defines social networks from an ego-centred standpoint (Wellman, 2007a, b). An 'ego-centred' (or 'personal') network is defined as one actor's set of relations with other actors. It is composed of a focal actor (named ego), a set of ego's direct social contacts (named alters) and the ties between them (figure 1)[4]. This perspective uses networks to unpack the social context in which individuals are embedded and to suggest a kind of 'enriched individualism'. It is particularly appropriate for analyzing actors' networks that have a diversified composition that is not limited by any geographical, organizational or community boundaries. It is thus particularly relevant for the analysis of the networks of informal African urban entrepreneurs, which are often composed of a mixture of business, friendship and kinship ties. Instead of focusing on ties with some specific social category, an entrepreneur's social network directly refers in our approach to *regular social relations conveying useful resources for the current exploitation of an activity* (both tangible and intangible, economic and social)[5]. Such ego-centred networks can be described according to three salient dimensions: network structure, the content of ties, and member attributes (figure 1). It is useful for analyzing and evaluating the extent to which different configurations of personal networks, in relation to the three dimensions, tend to influence the economic outcomes achieved by entrepreneurs. Before focusing on the data and

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[3] This perspective aims to describe the structure of relations inside groups, clubs, organizations or other finite social sets. The issue refers in particular to centrality and power distribution inside these groups.

[4] Ego-centred networks emerged as an analytical tool with the work of social anthropologists from the Manchester School; especially concerning the structure of social relationships in the urban areas of the Copperbelt in Africa (Mitchell, 1969). Their methods were qualitative and based on observation survey.

[5] These resources may be ideas, advice, information, capital, business partnership, 'bureaucratic goodwill' or administrative support, financial support in times of crisis or for investment, contact for recruitment, etc (see section 4).

methods used to construct the specific network indicators of each dimension, we need to clarify how each dimension is articulated with economic outcomes, notably in African MSE.

3. The three dimensions of ego-centred networks and their economic impact

Each dimension has been the subject of a range of discussions and theories in the sociological literature; here we will focus on the essential contributions cited in figure 1. These theories are evidently closely linked with economic discussions in the social capital framework.

The strength of a tie is defined by Granovetter (1973: 1361) as 'a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie'. The importance of weak ties results from their bridge function[6]. Weak ties play a crucial role in accessing information, such as in the labour market (Granovetter, 1995). However, the effect of the strength of ties on economic activities is not univocal and may be contingent upon the social context or the type of resource exchanged (Granovetter, 1983; Krackhardt, 1992). Strong ties are more approachable and may ensure higher quality in the transmission of resources. It may thus be useful for vulnerable actors. The empirical literature on small entrepreneurship in Sub-Saharan Africa confirms these two aspects. In her case studies carried out in Guinea, Lourenço-Lindell (2002) argues that while weak ties are more flexible and easily manipulated; they are also more vulnerable in times of crisis (unlike strong and affective ties). In the case of agricultural traders in Madagascar, Fafchamps and Minten (1999, 2002) claim that weak ties, like non-kin relations, are crucial for accessing and sharing market information. But at the same time, they also underline the importance of strong ties in risk sharing or social insurance, and for market relations with suppliers and customers (regular relations ensure secure supply and demand, reduce transaction costs, favour credit or delayed payment). The role of strong ties, notably kin relationships, in accessing capital required to start a business has also been widely demonstrated.

The attributes of alters have been studied essentially from the standpoint of the social resources theory, or social capital theory, elaborated by Nan Lin (1999, 2001). Taking a hierarchical view of social structure, Lin argues that the success of an action depends on two factors: the presence of high social status contact in the personal network (which enables access to better quality and relevant resources) and the status diversity of the network (which increases the probability of accessing appropriate resources for any issue). In the economic literature, this approach refers to the notion of 'linking social capital' (Woolcock, 2001) which describes ties that connect individuals to people or groups in positions of political and financial power. The adaptation of this theory in the context of an African informal economy has only very rarely been the object of empirical analysis and assessment. Some notable exceptions include Barr's (2002) study of Ghanaian manufacturing sector and Meagher's (2006) analysis of Nigerian clusters. They distinguish what they respectively call 'solidarity' or 'survival' networks from 'innovative' or 'accumulation' networks. Survival networks tend to be small, dense, locally concentrated and with poorly resourced personal relations (with no access to advantageous economic positions or privileged commercial groups). These types of network tend to be very homogeneous in terms of member attributes. Though they reduce risks and income variability, they have little impact on economic performance and tend to

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[6] In a network, a bridge is a tie that provides the only path between two individuals or groups of individuals. The central hypothesis of Granovetter (1973) is that strong ties create closed networks whereas weak ties enable access to social circles beyond actors' own direct network. In social capital literature, this is referred to as 'bridging social capital' as opposed to 'bonding social capital' (strong family and community ties) (Woolcock, 2001).

undermine rather than enhance profits (Barr, 2002)[7]. Conversely, accumulation networks are wide, geographically dispersed, and much more diversified in terms of member status. They are composed of advantageous ties with privileged access to resources (ties with privileged social classes, civil associations and successful traders, especially international traders).

Barr and Meagher's typology is useful for extending the final dimension of the ego-centred network. The opposition between dense solidarity networks and open wide accumulation networks is one of the rare empirical insights into network structure in African entrepreneurship. Relevant measures of network structure are absent from most empirical surveys, if we consider that network size is inadequate. This is precisely the point of Burt's (1992) 'structural holes' argument. According to Burt (1992:17), what matters is not the number of contacts so much as 'the numbers of non-redundant contacts'. 'Contacts are redundant to the extent that they lead to the same people, and so provide the same information benefits'. A structural hole is the gap between non-redundant contacts. The greater the number of structural holes in an actor's network, the greater the returns in terms of information access and control (position of 'tertius gaudens'). However, Burt's argument requires a more extensive discussion since it is in sharp contradiction with other approaches to network structure. Coleman (1988), and to some extent Granovetter (1985), argue that dense and cohesive networks enable the emergence of collective norms and therefore have a significant impact on actors' behaviour. Social control and pressure may limit treachery and favour trust and cooperation. Finally, the effects of structural holes on economic outcomes may be contingent upon the social context and type of activities considered.

4. Data and measurement options

The data

The data were collected in the informal economy of Bobo-Dioulasso in Burkina Faso. Burkina Faso is one of the poorest countries in the world. Real GNI per capita was estimated at US\$ 430 in 2007 (World Bank, 2009). 46.4% of its population lives under the poverty line (INSD, 2003). Although Burkina Faso has undergone considerable economic growth since 1990 (more than 4% per year in average), it had to withstand a significant increase of urban poverty. This phenomenon, common in most West-African countries, has caused the informal economy to become a major source of income and livelihood for urban populations. In Burkina Faso, the importance of the informal economy matches regional tendencies (Webster and Fidler, 1996; Brillaud and al., 2004). In Bobo-Dioulasso, the informal economy represents 49.5% of local value added and 68.2% of employment (Fauré, Soulama, and al., 2000).

Between February and July 2007, we conducted a survey on a representative sample of 317 entrepreneurs[8]. Firstly, sociodemographic and economic data were collected, focusing in particular on features, type of activity, employment, economic capital and outcomes. Secondly, the resulting statistical information was completed several weeks later by collecting

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[7] According to Barr (2002), these networks characterize small businesses located on the fringes of formal institutions (informal economy), whereas innovative networks are representative of enterprises with access to formal institutions.

personal network data on a sub-sample of 278 entrepreneurs[9]. The survey focused on small urban private economic activities carried out outside fixed homes. Only owners, or real managers of activities, have been interviewed. The boundaries of the informal economy were empirically defined according to three aspects: (i) administrative registration (commercial register, fiscal register, national social security fund); (ii) activity size defined by the number of employees (with a threshold of five wage workers); (iii) type of accountancy (relatively formal, personal diaries, no accountancy). According to our definition, an informal activity is an activity that does not fall under the formal institutional framework for at least two of these selection criteria. The sample is representatively distributed by economic sectors (production, trade and services) and sub-sectors, and by geographical area, in relation to the results of the last exhaustive census of economic activities carried out in Bobo-Dioulasso (Fauré, Soulama, and al., 2000). In practical terms, the respondents were mainly selected anonymously by using a random walk technique through the city. Some were selected in dense activity locations (marketplaces, major roads), while others were chosen in more isolated areas.

The multiple name generator instrument

There are different instruments for the collection of data concerning personal networks (Marsden, 2005, Wasserman et Faust, 1994). The name generators method is the most commonly used in the field of entrepreneurship, and is structured around individual questionnaires that can be easily integrated in traditional quantitative surveys (Burt, 1984).

Name generators consist of one or several questions that invite a respondent (ego) to recall and elicit people (alters) with whom he maintains certain types of direct relationships. They are usually followed by questions, called 'name interpreters', that gather information on the attributes of alters, the relationships between ego and each alter, and the relationships between alters. The purpose of name generators is obviously not to establish the total number of alters in entrepreneurs' personal networks, but to elicit a representative sample in order to identify the core members of the network (Marsden, 2005). In order to identify an ego's relationships, several criteria can be used as a basis for the construction of the generators (Campbell and Lee, 1991). Criteria of specific social exchange (persons involved in regular relations of material or intangible support) have the advantage of being clear and unequivocal, since they are less likely to be interpreted differently across respondents. The name generators method has already been implemented in studies of women's social support network in rural Africa. It has revealed a reasonable reliability, particularly in its capacity to delineate the core of personal networks (Bignami-Van Assche, 2005; Adams and al., 2006). In the field of entrepreneurship, it has been commonly used in studies of industrialized societies (Greve and Salaff, 2003), but it has only been very rarely used in Sub-Saharan Africa.

Our instrument was constructed after several tests in order to take account of different biases identified in the literature (such as memory and cognitive biases). It is based on multiple names generators (Fischer, 1982; Burt, 1997). Eight name generators are used (see the detailed generators in box A1). They are defined on the basis of a criterion of interdependency or regular interaction of people involved in social relations conveying resources required for the current exploitation of their informal activity (during the last twelve months). Seven types of exchanges, or resources, are used to construct the first seven generators: (i) advice,

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[9] We will not present the construction of the first questionnaire, which is more commonly-used and strongly inspired from phase two, and devoted to the informal sector, of 1-2-3 surveys (Amegashie and al., 2005). The first survey was conducted by J.-P. Berrou and four interviewers. The second survey, focusing on social networks, was conducted by J.-P. Berrou, with the help of an interpreter. A two-step survey was adopted because of the duration of interviews and also in order to improve the level of trust between the interviewer and the respondent.

information and ideas (concerning markets, management, investment, partners); (ii) support in administrative or bureaucratic relationships (with local institutions, to obtain favours concerning tax payments, local placement or conflict resolution); (iii) regular suppliers; (iv) faithful customers; (v) cooperation or partnership (entrepreneurs who assist each other, sometimes pooling resources and contacts); (vi) financial support (for example in times of crisis); and (vii) contact for recruitment (access to employment). Lastly, a 'contextual name generator' (Bidart and Charbonneau, 2007) was inserted. It refers to important support relations at the moment of business start-up, which are always active in entrepreneurs' networks. In order to limit the duration of interviews (average of 45-60 minutes), the number of alters cited for each generator was restricted to three (two for the second generator)[10]. Furthermore, in addition to the eight generators, a final name eliciting question was added for additional important contacts that may have been forgotten. Once the entire name list had been elicited (1964 names), respondents were asked to characterize each relation from a social role standpoint (kin, friend, neighbour, business tie, acquaintance). For a representative sub-sample of relations (1324), complementary name interpreters then focused on the content of ties (duration, contact frequency, trust intensity, context of creation), alters' attributes (age, gender, ethnicity, schooling, occupation, status), and ties between alters (none, acquaintance, especially close)[11]. Name interpreters regarding alters' attributes only concern observable characteristics since they are better informed than alters' attitudes or opinions (Marsden, 2005). Data on ties between alters were collected through matrices crossing elicited names. By focusing only on the fact that alters know each other very well, a little, or not, the likelihood of an emotional or perception bias regarding this question is thereby reduced (respondents were also allowed to answer that they didn't know anything about a possible relation between two alters).

Measuring dimensions of ego-centred networks

The data collected during our survey can be divided into two datasets. The 'entrepreneurs dataset' (n = 317) is made up of variables concerning entrepreneur features and economic activities. The 'ties dataset' (n = 1324) concerns the data of the sub-sample collected through name generators and interpreters. The data provide individual profiles of respondents' personal network members that can be aggregated into measures of an entrepreneur's network configuration according to the three dimensions (content of ties, alters' attributes, network structure).

The content of social relations that compose entrepreneurs' personal networks can be divided into three salient dimensions: social role, resource or exchange content and strength. In the case of the first two dimensions, the proportion of professional ties in networks and the proportion of tangible resources among conveyed resources have been considered[12]. More importantly, the strength of ties needs to be examined. Because the issue is evidently multidimensional (see Granovetter's definition above), we need to compute a quantitative measure inferred from available variables: tie contact frequency, duration, intensity (or trust closeness) and reciprocity (or mutual aid). To do so, we use multiple correspondence analysis (MCA) to compute a succession of quantitative variables summarizing our four initial categorical variables. As shown in table A.1 and figure A.2, the first principal component

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[10] It is important to remember that this constraint does not prevent an estimation of the differences between the size of individuals' networks.

[11] The sub-sample is made up of the first quoted names in each generator, as Fischer (1982) suggested in his survey of personal network support in San Francisco.

[12] Among all resources potentially conveyed by social relations, tangible resources include suppliers, customers, and cooperation ties, and financial and start-up support as opposed to advice and information, administrative support and recruitment ties (informational resources).

generated by MCA offers a trustworthy weighted combination of the initial variables. Individuals' coordinates on this first component can thus be used to evaluate ties' strength. For the purposes of clarity, these coordinates were transformed into a quantitative variable ranging from 0 to 1, from the weakest to the strongest tie in the sample[13].

Our analysis of alters' attributes in entrepreneurs' personal networks focuses on three different aspects. The first is social status (Lin, 2001). Considering ego, we distinguish alters enjoying an *intermediate status* (business owners of the upper part of the informal sector, small and medium-sized formal enterprise owners, and workers and non qualified employees in the formal private and public sectors) and alters enjoying a *higher status* (executives, managers and officers in the formal private and public sectors, intellectual and intermediary professions in the formal private and public sectors)[14]. In order to avoid a restrictive view of an alter's attributes, we also considered the socio-demographic similarity between an ego and his alters (homophily, or its reverse, heterophily). This similarity is evaluated using four socio-demographic characteristics (age, ethnicity, religion, and geographical location)[15]. In other words, this dimension reflects the socio-demographic opening of entrepreneurs' networks. The last aspect concerns the professional occupations of a network's members. It can be appreciated through the diversity of alters' occupations, measured by the ratio between the number of distinct occupations among an ego's relations and the total number of ties in its network. Lastly, regarding the opening of an ego's relations onto other occupations than his own, we consider the proportion of ties involving alters belonging to the same profession as the ego.

Network structure and the idea of structural holes can be measured in different ways. A first simple measure is provided by network density (number of existing ties between alters divided by the total potential ties). A more in-depth approach is provided by Burt's famous measure of 'structural constraint', since it simultaneously expresses both size and density of personal network. It measures the extent to which the overall relational investment of ego implies, directly or indirectly, a same alter. It is computed as the sum of structural constraints exerted by each alter, which depend on an ego's relational investment and alters' connections[16]. Measurements of the structural constraint for each respondent have been calculated using UCINET VI (Borgatti and al, 2002). The results range from zero for wide networks of non-redundant contacts to one for limited and tightly interconnected networks.

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[13] Obviously, the strength of tie needs to be considered in relation to the fact that we focus on the core members of an entrepreneur's personal network. That's why aggregated measure of strength of ties in entrepreneur's network is based on the median strength and not the average one.

[14] Consequently, alters enjoying a *lower status* than ego are informal employees and apprentices, small farmers, and non-working population; and those enjoying a *comparable status* include small-scale entrepreneurs and regular employees within the informal sector.

[15] Ties are considered heterophilic when alters are similar to egos for at most one of these four characteristics.

[16] Considering C_{ij} the structural constraint of *j (alter)* for *i (ego)* and p_{ij} the weight of the tie between *i* and *j* in *i*'s network (if *i*'s network's size is *n*, $p_{ij} = \dfrac{1}{n}$); aggregated constraint is defined by Burt (1992:54-56) as:

$$C_i = \sum_j C_{ij} \; ; i \neq j \; ; \text{with}$$

$$C_{ij} = \left(p_{ij} + \sum_q p_{iq} p_{qj} \right)^2 ; q \neq i, j$$

5. Empirical findings

Main features of the sample[17]

In Bobo-Dioulasso, as in most informal economies, the dominant form of business is self-employment. Entrepreneurs tend to be relatively young (35.5 years in average) and their households are composed of 7.5 members on average. Only 26% of them have a level of education above primary education. These last are more represented in services sector, and especially in catering activities. In the informal economy, training is essentially ensured through traditional on-the-job apprenticeships. Most entrepreneurs followed a predominantly informal route (from family assistant to apprentice and then owner). The average duration of activities indicates their relative youth (7.6 years in average), with some significant differences according to the sector of activities in question. In particular, production activities have a much higher average longevity (9.5 years) than other activities. Regarding legality, 11% of firms are registered in an official commercial register (mostly trade activities). The localization of economic exchanges confirms the autarkical confinement of informal activities, since it is mainly concentrated in the perimeter of the city for both customers and suppliers. The measurement of economic performance reveals that earnings are higher in trade and catering activities than in production and other services[18]. However, the production sector is the most important in terms of employment and wage distribution. Trade and production clearly dominate other sectors in terms of the average value of economic capital.

A typology of entrepreneurs' social networks

Cluster analysis is a multivariate procedure used for detecting groupings in data. More precisely, we use k-means cluster analysis[19] to identify homogeneous groups of entrepreneurs based on the entire range of selected characteristics describing the dimensions of a network. The analysis suggests the existence of four homogenous clusters categorizing the different kinds of networks supported by entrepreneurs. Since all observations are classified in this procedure, the resulting typology may be blurred by individuals whose network profile is not distinct from the average profile. To avoid such a flaw, we created a fifth category that includes entrepreneurs whose network is indistinct in terms of the categories produced by cluster analysis[20]. In order to describe the resulting typology, table 1 shows the average values of the full range of nine classification variables for each category. Moreover, to facilitate the interpretation of the results, table 2 indicates the average values of some other relevant variables dealing with the entrepreneur, and with other characteristics of his network and activity.

The last columns of tables 1 and 2 provide some interesting general insights into the average nature of entrepreneurs' personal networks in the sample. The average size of entrepreneurs' networks is 7.1 members. Over half of the ties composing their networks are created before the start-up of activities, and nearly a third are very strong. However, the median strength of ties is relatively moderate (.449), as is the average structural constraint (.564). This is partly

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[17] See table A.2.
[18] Catering activities in particular have taken advantage of the increase of the urban population and of changes in food behaviors in urban areas. Because of successive crises, weakening purchasing power and increasing oil product prices, more and more workers are forced to have lunch in restaurants (or 'maquis') at their workplace instead of having it at home.
[19] This method uses an algorithm that examines and reassigns, if appropriate, each observation in turn to a different cluster, in an attempt to simultaneously minimize variance within groups and maximize variance between groups. See Hartigan (1975).
[20] We therefore selected the 20% of entrepreneurs whose euclidean distance to the average observation is the weakest.

Table 1 :   **Networks identification ; means of classification variables by cluster***

Classification variables	Clusters					
	A	B	C	D	Indistinct	All
Network's structure						
Structural constraint	.573	**.484**	**.431**	**.906**	**.481**	.564
Content of ties						
Median strength of ties	**.572**	**.321**	**.345**	**.524**	.446	.449
Proportion of professional ties	**.412**	**.703**	.514	**.589**	.520	.539
Proportion of tangible resources	**.595**	**.782**	**.618**	.655	.646	.657
Alters' attributes						
Proportion of intermediate status relations	.207	.208	**.161**	**.272**	.207	.209
Proportion of higher status relations	**.091**	**.066**	**.380**	**.093**	.140	.145
Proportion of heterophilic ties	**.206**	.250	**.526**	**.175**	.243	.272
Proportion of intra-profession ties	**.349**	.332	**.130**	.294	.270	.284
Number of distinct occupations	**.403**	**.419**	**.542**	**.534**	.429	.456
N	**72**	**56**	**46**	**42**	**54**	**270**

Notes : (*) Clusters have been identified using K-means cluster analysis – The values that significantly differ from those of other clusters (independent samples t-tests) are in bold type in the table – Entrepreneurs whose network shows no perceptible specificity have been gathered in the "indistinct" cluster ; for measurement option see section 4.

Table 2 :   **Networks characterization ; means of characterization variables by cluster***

Characterization variables	Clusters					
	A	B	C	D	Indistinct	All
Network						
Size (number of ties)	7.3	6.9	7.4	**4.6**	**8.7**	7.1
Proportion of strong ties[1]	**.431**	**.185**	**.185**	**.421**	.306	.311
Proportion of ties set up prior to activity's creation	**.656**	.526	.519	.595	.552	.575
Proportion of family ties	**.370**	**.183**	**.186**	**.391**	.269	.283
Proportion of close-friendship ties	**.270**	**.181**	.245	.202	.259	.235
Proportion of arm's-length sociability ties[2]	**.249**	**.367**	.329	**.204**	.306	.292
Proportion of business-family ties[3]	**.129**	.061	**.030**	**.140**	.078	.089
Proportion of business-sociability ties[3]	.517	.534	.488	**.433**	.576	.515
Suppliers credit	.306	.357	.283	.214	.259	.289
Total number of distinct resources	**6.15**	5.71	5.56	**4.43**	**6.67**	5.80
Proportion of social resources	**.675**	**.512**	.630	.604	.626	.613
Multiplexity[4]	1.51	1.50	**1.37**	**1.67**	**1.41**	1.49
Average level of education[5]	**1.59**	**1.56**	**2.32**	**1.45**	1.74	1.72
Proportion of same or lower status relations	**.702**	**.726**	**.459**	.635	.654	.645
Entrepreneur						
Years of living in Bobo-Dioulasso	24.4	**21.2**	24.6	22.1	**26.9**	23.9
Age	35.8	**33.1**	**37.5**	35.7	35.8	35.5
Gender[6]	.167	.125	.174	.214	.130	.159
Ethnic group[7]	.431	.393	**.261**	.476	.407	.396
No education	.417	.375	**.196**	.429	.315	.352
Secondary education or more	.208	**.179**	**.457**	.286	.241	.263
Experience (years as owner of present activity)	6.7	**4.9**	**8.9**	6.6	7.4	6.8
Activity						
Length of activity's existence	7.7	**5.8**	8.9	8.1	7.9	7.6
Makeshift workshop[8]	.347	**.393**	**.130**	.357	.204	.293
Production	.319	.375	.413	**.143**	**.463**	.348
Trade	.375	.286	**.087**	**.500**	.241	.300
Catering	.097	.089	**.196**	.119	.130	.122
Other services	.208	.250	.304	.238	.167	.230
N	**72**	**56**	**46**	**42**	**54**	**270**

Notes: (*) The values that significantly differ from those of other clusters (independent samples t-tests) are in bold type in the table ; (1) See table 1; strong ties are those whose strength ranks them among the highest third of the distribution; (2) Include acquaintances, labour colleagues, and neighbours; (3) Proportion of ties simultaneously qualified of business and family ties (or business and sociability ties) among the total business ties; (4) Average number of resources conveyed by tie; (5) This variable is computed on the basis of a five level scale of education ; (6) Binary variable ; 0 = male and 1 = female; (7) Binary variable ; 1 = Mossi and 0 = other ethnic groups; (8) Binary variable ; 1 = makeshift workshop and 0 = solid workshop.

explained by the strong proportion of business ties in entrepreneurs' networks (average of 53.9%). Compared to business and sociability ties (close friendship and arm's length sociability, 52.6%), the proportion of kinship ties remains relatively weak (28.3%)[21]. These results suggest that informal entrepreneurs in Bobo-Dioulasso are not completely embedded in 'bonding ties' (intra community and family ties). Moreover, about a half of all business ties are also described as sociability ties (labour colleagues and close friends especially), whereas just 9% are also described as kinship ties. So, when business relations are embedded in other social relationships, it is rarely in kinship ties. Most network members enjoy the same or a lower status than the entrepreneur (average of 64.5%), and resources conveyed by social relations are for the most part tangible (65.7%). Since indistinct networks do not require any specific comments, we will now focus on the four specific identified networks[22].

Network A can be called *urban solidarity network (USN)*. It includes a significant proportion of strong ties, particularly kinship and sociability ties. Conversely, it has the weakest proportion of business relations. The resources conveyed by this network are for the most part intangible (particularly advice, information and support in administrative relationships)[23]. This urban solidarity network is mostly composed of social resources[24]. It is also quite rich in terms of the number of distinct resources conveyed per network. In this kind of network, members are not highly educated and mostly occupy the same status (or an inferior status) and profession as the ego. Ties are relatively homophile (socially homogeneous). One outstanding difference with Barr (2002) and Meagher (2006) is that the structural constraint is not particularly strong but is rather close to the average, as well as network size. This result partly confirms the likely decoupling of inter-personal relationships from their community framework in an urban context of economic pressure. This context favours the emergence of new forms of social solidarities that are more selective (even instrumental) and more affinity-based (the role of sociability ties) and that have a more contractual nature (Marie, 1997; Meagher, 2006; Lourenço-Lindell, 2002). Finally, this kind of network is especially well distributed among all activities and entrepreneurs.

Network B may be described as a network of insertion through business (or market), or to sum up, a *business network of insertion (BNI)*. It is a medium-sized network, mostly composed of weak business ties, but very few kinship relations, which accounts for its relatively low level of structural constraint. It mainly conveys tangible resources and market resources through regular suppliers, customer ties, and business partnerships. In this kind of network, sociability ties mostly include acquaintances and labour colleagues that rarely enjoy a high social status (horizontal bridging ties, or arms' length ties). It is known as a business network of insertion because its very low proportion of social resources may reveal the low level of social integration of considered entrepreneurs. Indeed, it is particularly frequent among young entrepreneurs who recently moved to the city and who have very little professional experience (relatively new activities). Almost 40% work in makeshift workshops. The social integration of these entrepreneurs is thus chiefly developed through their business activity and their regular market-based relations.

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[21] Note that each relation can potentially be classified in two social role categories (a parent who is also a client for example), which explains that the total percentage exceeds 100%.

[22] Note that indistinct networks are admittedly wide and not much constraining, but they are not significantly distinct in terms of the content of ties and alters attributes (table 1).

[23] See table A.3 for the detailed distribution of resources conveyed in each network.

[24] Social resources (or non-market resources) include advice and information; administrative support; financial and start-up support; and contact recruitment. They are distinct from market resources (regular suppliers; loyal customers; and business partnerships).

Network C can be called *linking network* in reference to 'linking social capital' (Woolcock, 2001). It is characterized by a strong proportion of high social status (38%) and highly educated relations. These relations are often weak, strongly heterophilic (socially heterogeneous) and widely extra-professional. It is an average-sized and little constraining network. Although the proportion of kinship ties is the lowest, business ties are not significantly higher than in network A. Ties tend to be relatively specialized (low multiplexity) and convey more intangible resources, such as information for contact recruitment. Conversely, cooperation and partnership ties remain rarer than in other networks. This type of network is well developed among experienced entrepreneurs with high levels of education, particularly in catering activities and the production sector (unlike the trade sector). This can be explained by the fact that restaurant owners, joiners or garment makers tend to access high social status individuals through their clientele.

Finally, network D is the most similar to the 'solidarity network' identified by Barr (2002) or Meagher (2006). It is very small, strongly constraining and poorly resourced. It shall be referred to here as a *dense solidarity network* in order to differentiate it from the new urban solidarity network described above. This network is based on a high proportion of business and kinship ties rather than sociability ties. Business ties are rarely weak, with some of them also qualified as kinship ties (14%). The resources conveyed by this network are mainly advice and information, and loyal customers. Considering the small size of these networks, ties are highly multiplex (i.e. they simultaneously convey several resources). Although they include a relatively important proportion of members enjoying an intermediate status, their level of education is the weakest, and the network still remains socially homogenous. Such a dense solidarity network is quite typical of retail trade activities (50% of entrepreneurs supporting such networks are small traders).

Informal entrepreneurs' ego-centred networks and their economic performance

We are now in a position to assess the relevance of networks' configuration as a predictor of entrepreneurs' economic performance. Multiple linear regressions were used to investigate the extent to which inputs, business and entrepreneurs' characteristics, but also the configuration of networks, help to predict performance indicators such as business value added and earnings. The regression coefficients indicate the change in performance indicators corresponding to a unit change in the appropriate explanatory variable, conditional on the other variables remaining constant. We may thus assess the impact of social networks on economic performance, whatever the value of other explanatory variables.

Concerning endogenous variables, value added is computed on a monthly basis as the difference between sales turnover and intermediate consumptions and raw materials expenses. Earnings are computed on a monthly basis as the difference between sales turnover and global monthly expenses, including raw materials and intermediate consumptions, current charges (of which wages and rents) and financial and administrative charges. Both value added and earnings are expressed in Francs CFA and their logarithms are introduced in the model.

Two blocks of predictors were implemented, i.e. usual predictor variables of informal business performances (inputs, business and entrepreneurs' characteristics) and predictor variables featuring entrepreneurs' networks. With respect to the usual independent variables in the model, the following remarks can be made. Firstly, capital input is a monetary estimation of the actual value of the machinery, tools, equipment and stocks owned by entrepreneurs at the time of the survey. Labour input is measured by the monthly monetary value of wages paid to business employees, whatever their status. The effective contribution of labour to economic performance may thus be more easily appreciated, since the usual 'number of employees' variable is likely to suffer from serious productivity bias. For self-

Table 3: Hierarchical multiple regression analysis summary for variables predicting value added and earnings (N = 270)

Outcome variables :	log (value added)	log (earnings)
Predictors[1]		
Constant	2.697 (13.962)***	3.236 (12.547)***
Inputs		
Log (capital input)	.081 (2.481)**	.077 (1.777)*
Log (labour monthly input)[2]	.339 (9.878)***	.127 (2.778)***
Business characteristics		
Retail trade[3]	.224 (4.402)***	.250 (3.686)***
Catering[3]	.380 (5.036)***	.519 (5.149)***
Pluriactivity[4]	.100 (1.706)*	.138 (1.774)*
Administratively registered activity[4]	.137 (1.997)**	.200 (2.189)**
Favourable economic situation[5]	.172 (3.944)***	.208 (3.580)***
Entrepreneurs characteristics		
Primary education or more	.050 (1.186)	.063 (1.114)
Experience[6]	.087 (2.071)**	.118 (2.096)**
Gender[7]	-.106 (-1.660)*	-.095 (-1.112)
Ethnic group[8]	-.013 (-.317)	.020 (.352)
Professional organisation[9]	.151 (2.658)***	.198 (2.613)**
Demand anticipation[10]	.107 (1.724)*	.190 (2.293)**
Networks configuration		
Urban solidarity network[11]	.160 (2.747)***	.203 (2.616)***
Business network of insertion[11]	.158 (2.547)**	.193 (2.337)**
Linking network[11]	.064 (.971)	.103 (1.174)
Dense solidarity network[11]	.152 (2.203)**	.189 (2.042)**
Causality issues		
Network set up prior to activity's creation[12]	-.053 (-1.115)	-.045 (-.711)
Network set up after activity's creation[13]	-.067 (-1.220)	-.101 (-1.385)
F (sig)	15.595 (.000)	7.450 (.000)
R^2	0.542	0.362
Adjusted R^2	0.508	0.313
Durbin-Watson test (sig)	1.905 (p < .01)	1.888 (p < .01)

Notes : (1) Unstandardized estimated coefficients are shown, t tests are in brackets, ***$p < .01$, **$p < .05$, *$p < .1$; (2) for independent workers, log(labour monthly input) is standardized to 3.17 for continuity purpose ; (3) dummy variable, 0 = other activities ; (4) dummy variable ; (5) dummy variable, 1 = activities that have experienced a favourable economic situation this year ; (6) dummy variable, 1 = entrepreneurs conducting their business since at least 5 years ; (7) dummy variable, 1 = female ; (8) dummy variable, 1 = Mossi ; (9) dummy variable, 1 = members of one or several professional organisation ; (10) dummy variable, 0 = entrepreneurs who set the level of their activity only according to placed orders and/or their productive capacities (11) dummy variable, 0 = entrepreneurs whose network is indistinct ; (12) dummy variable, 1 = networks in which more than 2/3 of ties were set up prior to activity's creation ; (13) dummy variable, 1 = networks in which more than 2/3 of ties were set up after activity's creation.

employed individuals, the value of log (labour input), which should normally be - ∞, was arbitrarily set to 3.17 to ensure the continuity of the variable. Secondly, business characteristics capture the impact on performance of engaging in retail trade or catering activities rather than any other activity or trade. It also considers the alleged positive impact of administrative registration, pluriactivity and the favourable economic situation in the course of the present year. Thirdly, entrepreneurs' characteristics include variables that help to describe the human capital of entrepreneurs (primary education and on-the-job experience), entrepreneurial behaviour (demand anticipation), gender, ethnic group and membership of a professional organisation. The second block is designed to introduce information about entrepreneurs' social networks as predictors of performances. In doing so, we will be able to test the impact of entrepreneurs' membership of some kind of network or other on performance, *ceteris paribus*. We therefore introduce four additional binary variables in the model, assessing the membership of entrepreneurs to one or the other of the previously determined network categories.

Yet in this kind of econometric analysis, the direction of causality between the configuration of networks and entrepreneurial success may be doubtful. Standard econometrics uses the method of instrumental variables to estimate causal relationships. It enables a consistent estimation when the explanatory variables are correlated with the error terms, which may ccur when the dependent variable causes at least one of the explanatory variables ('reverse' causality). In this situation, ordinary linear regression generally produces biased and inconsistent estimates. If an instrument is available, consistent estimates may still be obtained. An instrument is a variable that does not belong in the explanatory equation and is correlated with the endogenous explanatory variables, conditional on the other explanatory variables. Moreover, the instrument cannot be correlated with the error term in the explanatory equation, i.e. the instrument cannot suffer from the same problem as the original predicting variable. In our case, suitable instruments are scarce and those which may be relevant, such as the family and social background of entrepreneurs, are unavailable in the database. Therefore, we suggest controlling the actual impact of a possible « reverse » causality problem. If such causality exists and is significant, then economic performance partly explains the constitution of such or such a type of network. In this case, the performance of entrepreneurs whose network was largely set up prior to the creation of their activity should be, all things being equal, significantly different from others… and it should be the same for entrepreneurs whose network was largely set up after the creation of their activity. Thus, the introduction within the model of variables assessing the precedence or posteriority of the constitution of the network regarding the creation of the activity is likely to control possible 'reverse' causality.

The results of multiple regressions are shown in table 3[25]. Means and standard deviations are presented in table A.4, included in the appendix. Model (1) significantly predicts value added $F(19, 250) = 15.595$, $p < .01$, adjusted $R^2 = .508$ and model (2) significantly predicts earnings $F(19, 250) = 7.450$, $p < .01$, adjusted $R^2 = .313$. It appears in each model that the introduction of the second block of variables significantly improves the quality of informal performance prediction above standards[26]. Thus, we demonstrate that the configuration of entrepreneurs' social network matters. This issue may be an important aspect of entrepreneurial success. However, it also appears that the different performance indicators are not affected in the same way by entrepreneur's membership in some network type or other. This stimulating result will now be discussed.

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[25] The assumptions of linearity, normally distributed errors and uncorrelated errors were checked and met.
[26] See for example Kuegie, Nordman and Roubaud (2006), Gindling and Terrell (2005) or Funkhouser (1996).

6. Discussion and concluding remarks

The collection of rich data concerning entrepreneurs' ego-centred network has helped to produce a well-informed typology of their social networks in the informal economy of Bobo-Dioulasso. This typology goes beyond the classical opposition in the economic literature between solidarity networks, in informal firms, and accumulation or innovative networks developed in formal firms (Barr, 2002; Meagher, 2006). Our results suggest that even in an informal economy different forms of social networks are observable. Evidently each network has a different impact on economic performance.

The first important outcome of our paper is that, surprisingly, LN (linking social capital) has no significant impact on the economic performance of entrepreneurs in the informal economy of Bobo-Dioulasso. This issue is of particular interest since it is in sharp contradiction with the assumption that the presence of alters with privileged social status in an ego's network ensures access to high quality resources and thus enhances economic outcomes (Lin, 2001). One explanation is the idea that resources possessed by privileged social classes are not particularly useful for entrepreneurs in the urban African informal economy (and more specifically in Bobo-Dioulasso)[27]. Resources conveyed by closer status individuals may be of greater utility. For example, it is especially relevant for administrative support. It is more useful for informal entrepreneurs to have relations with some field agents in fiscal administration rather than with managers or executives. These last are in a position that strongly constrains their possibilities of action, unlike the first. Another example is supplier relationships; the organisation and dynamics of large private formal firms are generally not adapted to those of informal activities. These last require a high degree of flexibility for their economic transactions because of the uncertainty that characterizes any informal economy. It is therefore easier to work with informal suppliers or small and medium-sized formal suppliers (the same kind of argument can be applied to partnership and cooperation relations). Moreover, considering the context of high uncertainty and vulnerability in any informal economy, approachability is of prior importance, as for example when instant access to financial support is required in times of crisis. Alters enjoying a high social status are too socially distant, which may give rise to asymmetrical relations. As Lomnitz (1988:48) suggests: 'The symmetry of the relationship depends on social distance: the closer the social relation, the greater the *confianza* and consequently the balance of the exchange'. Relations with the most powerful actors may lead to unequal relations of subordination and domination (Lomnitz, 1988; Lourenço-Lindell, 2002; Meagher, 2006). One final explanation rests on the idea of substitutability between social networks and inputs (notably capital). Indeed, since this network is well represented among older and experimented entrepreneurs, one may assume that it has played an important role in the history of the activity. It may have facilitated entrepreneurs' access to the actual capital raising its economic outcomes. From a methodological standpoint, this is an argument in favour of more investigation concerning the dynamics of social networks; notably through longitudinal data or, as suggested by Durlauf and Fafchamps (2004), qualitative surveys.

The second key result of our investigation is that solidarity networks matter in the informal economy of Bobo-Dioulasso. This result challenges established insights into solidarity networks that are often considered as reducing uncertainty though impeding performance (Barr, 2002), in particular because of the social constraint which it creates for entrepreneurs. Our paper quantitatively confirms an important aspect of social changes in contemporary

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[27] This result highlights the relevance of multiple names generators instrument, defined on a criterion of exchanged resources. Indeed, the use of instruments such as position generators (Lin, 2001, Barr, 2002) that predefine useful social categories may mistake that which has been experienced as what has to be demonstrated.

African cities. Urbanization and the persistent economic crisis have a paradoxical effect of increasing the need for community solidarities while reducing the necessary funds for these solidarities (Marie, 1997). This urban phenomenon implies a weakening of traditional social institutions and associated solidarities (Marie, 1997, Lindell, 2002, Meagher, 2006). This context favors the emergence of new forms of social relations that are more selective, more affinity-based, and more contractual (see instrumental). This is precisely what our typology indicates by distinguishing the traditional dense solidarity network (DSN) from the network we call urban solidarity network (USN). The former is typical of the solidarity network usually identified in the literature. It tends to be very small, tightly interconnected and quite poorly resourced. But contrary to Barr's conclusion, it is nevertheless quite efficient, particularly in trade activities. It is mostly composed of two crucial resources for small traders: information and regular customers (strong ties with clients ensure stable demand). Moreover, it is composed of the highest proportion of alters with an intermediate status. It appears that family or dense solidarity networks remain relatively efficient in the informal trade sector[28]. Compared to DSN, USN has a stronger impact on economic outcomes (see marginal effects, table A-5). This network takes advantage of approachability, homogeneity and decoupling. Although this kind of network includes less regular supplier and customer ties, it has an appreciable proportion of ties conveying social resources. Our results thus highlight the importance of social resources for informal entrepreneurs, particularly information and administrative support. Urban solidarity networks still play a crucial role of informal social insurance. Furthermore, an important aspect of urban solidarity network is approachability. Unlike the linking network, strong and homophile ties facilitate access to alters' resources. This type of network is therefore more resilient in the face of shocks. Another aspect of approachability is network homogeneity, especially regarding professional occupation. For informal entrepreneurs, network professional proximity and cohesion appear to be important (the ego knows each alter and its competences more precisely, which fosters a more efficient circulation of resources). Inter-firm cooperation may be a core determinant of the efficiency of firms in the informal economy of Bobo-Dioulasso. Indeed, this insight is supported by the significant and positive effect of the professional organisation membership dummy variable in the model. Regarding decoupling, the moderate social constraint is of prior importance since it may highlight the likely decoupling of inter-personal relationships from their community framework (and consequently the reduction of social pressure), particularly through business and bridging ties.

The last important result is that the business network of insertion (BNI) also has a significant positive impact on economic outcomes (weaker than that of USN though stronger than that of DSN; see marginal effects table A-5). As described above, this network essentially rests on weak business relations and a significant proportion of market and tangible resources. This type of network is well represented among young and relatively unexperienced entrepreneurs who have often recently moved to the city. Their social integration is thus principally based on market interaction. This type of strategy appears to be useful for these entrepreneurs. They benefit in particular from regular relations with suppliers, customers and business partners. Such regular ties, which may even be quite weak compared to other bonding ties, may have an important impact on the reduction of transaction costs: they reduce search costs and the time spent inspecting product quality; they also facilitate access to supplier credit (see table 2), and improve organization efficiency. Moreover, BNI is also characterized by a low level of structural constraint. Following Burt (1992), informal entrepreneurs embedded in low constraining networks benefit from greater autonomy, control and freedom of action. More

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[28] This is also the case for wide trading networks of some west-African ethnic groups such as the Mourides, Dioula, Hausa, etc.

specifically, transaction negotiation and price fixing is more favourable insofar as their various suppliers and customers are isolated from one another.

Finally, our paper implies some policy considerations. Our empirical results reveal the importance for small urban informal entrepreneurs of drawing on both embedded social relations (strong or bonding ties) and autonomous relations (weak, business, or bridging ties), i.e. the importance of coupling and decoupling (Granovetter, 2000; Woolcock, 1998). Given the high uncertainty and volatility of African markets, and even more in the informal economy, it is not particularly surprising that solidarity networks appear to be efficient for informal entrepreneurs' performances. Clearly, in such a context, small informal entrepreneurs seek to limit the level of exposure to market conditions. However, the type of network composed of an important proportion of strong kinship and sociability ties cannot easily be promoted through policy intervention. Yet our results also highlight the important difference between traditional dense solidarity networks and contemporary urban solidarity networks. The latter has a stronger and significant positive impact on entrepreneurs' economic performances. It is partly characterized by a decoupling of entrepreneurs' interpersonal relations outside communities, notably through business ties. Moreover, even though it has the weakest proportion of social and intangible resources, the BNI has also a strong positive impact on economic outcomes. Business ties and business networks matter in the informal economy of Bobo-Dioulasso. This is highly indicative of the need for institutions that encourage this decoupling and enable interaction between entrepreneurs. In other words, policy intervention needs to facilitate the creation of institutions that can favor the development of equitable market-based relationships and bridging ties (business and professional organizations, but also meeting places such as market-places or trade fairs). Such institutions may fulfill an important role by ensuring the efficiency of networks for informal entrepreneurs: professional approachability and cohesion (equitable linkages with entrepreneurs enjoying an identical or intermediate status). Some business sector specificities should also be considered. For example, dense networks appear to be efficient for small traders. Obviously, macro-economic and institutional contexts remain of prior importance, since business relations are more easily materialized and maintained in a stable and trustful environment. Moreover, the USN still plays a crucial role of social safety net for informal entrepreneurs. The removal of this social charge, notably by developing micro-insurances or other forms of social insurance for the poor, could potentially enable an even more productive mobilization of their social network by small entrepreneurs. To conclude, while further investigations on the subject are evidently required, one important methodological conclusion is that specific network data needs to be more frequently collected. For example, it may be fruitful to insert an ego-centred network item in 1-2-3 surveys (Amegashie and al., 2005). This item could be easily integrated in quantitative surveys through name-generator instrument, as suggested by Burt (1984) for the General Social Survey in the United States.

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Appendix

Box A.1. The names generators

1. Advices, informations and ideas
Usually, entrepreneurs know people they can ask some advices and information to, or with whom they can discuss and share some of their ideas and even some important issues concerning their business. For example ideas about how to improve and enlarge business, ideas about investment and management, or informations about markets, suppliers, customers, access to credit, and so on. During the last 12 months, is there any people you have asked advices or information to, or with whom you shared ideas concerning your current business? Please name up to three people with whom you have especially discussed about that kind of things.

2. Support in administrative or bureaucratic relationships
Within the framework of their business, small entrepreneurs often face some administrative obligations and problems.They have relations with the public authorities, the municipality (Bobo-Dioulasso central town council or town hall of arrondissement), the specialized organizations (as the chamber of commerce, professional associations, labour unions), the tax office, the police, and so on, for example concerning controls and inspections for the payment of taxes, the constitution of files to access public markets, the location of businesses...Generally speaking, in your current business, is there some people you rely on to settle that kind of problems concerning administrative burdens ? Please name up to two of these people.

3. Regular suppliers (access to goods and raw materials)
Within the framework of your business, regarding the purchase of goods, raw materials and equipments that are essential to your activity's exploitation, do you have personal contacts through which you access suppliers or suppliers with whom you maintained regular relations during the last 12 months? Please name up to three of these people.

4. Faithful customers or access to customers
Concerning customers, did you have, during the last 12 months, personal contacts which allow you to regularly reach them, to improve your reputation, or do you have "faithful customers" who regularly purchase your goods and/or allow you to reach good markets? Please name up to three of these people.

5. Cooperation or partnership with other entrepreneurs
Within the framework of their current activity, small entrepreneurs often develop some relations of mutual aid, partnership or cooperation with other entrepreneurs. As for example in the case of breakdowns, or when you do not have the appropriate tool, machine or good; and even when you cooperate in the process of production, the share of markets or the exchange of customers. Who are the entrepreneurs with whom you maintained such kind of relations? Please name up to three of these entrepreneurs with whom you personally and regularly cooperated during the last 12 months.

6. Financial support
In their current business, small entrepreneurs may face some financial difficulties causing problems to maintain the business and even threatening the activity with closure. Did you recently, during the last year for example, experience some financial difficulties, cash flow problems, or important breakdowns? If yes, how did you overcome such kind of situation? Did you ever asked for financial support to anybody? In addition, some entrepreneurs may decide to invest in new equipments in order to develop their business and workshop, or to replace their machines. Did you ever received financial support for that kind of investment? Finally, when you face that kind of problems, who do you rely on for financial support or help to reach for financing (whether it is gifts, loans or advances)? Please name up to three people to which you regularly asked for financial support during the last 12 months.

7. Access to employment (contact for recruitment)
Do you have employees, permanent or occasional, wage workers, familial assistant or apprentices? Concerning those hired during the last year, were there personal contacts which served as intermediaries for their recruitment? For example you may have hired them through a family member, a neighbour, a friend, a customer, and so on. Who are these personal regular contacts which have served as intermediaries for your recruitments, or by whom you would pass to recruit somebody for your activity? Please name up to three of these contacts.

8. Support for business start-up
At the time of your business start-up, did some people support you in such a manner that you consider them as very important for you during this period? If yes, how did they support you? Moral support, financial or material help? For example, how did you constitute your start-up capital? Among these people, with whom you still have been in regular contact during the last 12 months, please name up to three.

9. Opened question
Looking at the entire name list you have quoted, are there other people who you consider as very important for you in your activity's current exploitation and who do not appear on the list? If yes, how many people did we forget? Please name one of them.

Table A.1: **MCA components contributions – Strength of ties variables**

Variables (*categories*)	F_1	F_2	F_3	F_4
Frequency *(daily, one or several times a week, less than once a week)*	0,103	0,074	0,103	0,074
Durability *(< 2 years. 2-5 years. 5-15 years. 15-30 years. 30 + years)*	0,362	0,390	0,362	0,390
Intensity *(weak. intermediate. strong)*	0,396	0,508	0,396	0,508
Reciprocity *(yes. no)*	0,139	0,028	0,139	0,028
Adjusted inertia	0,045	0,001	0,001	0,000
Adjusted inertia (%)	74,895	2,195	1,111	0,105
Cumulative %	74,895	77,090	78,201	78,306

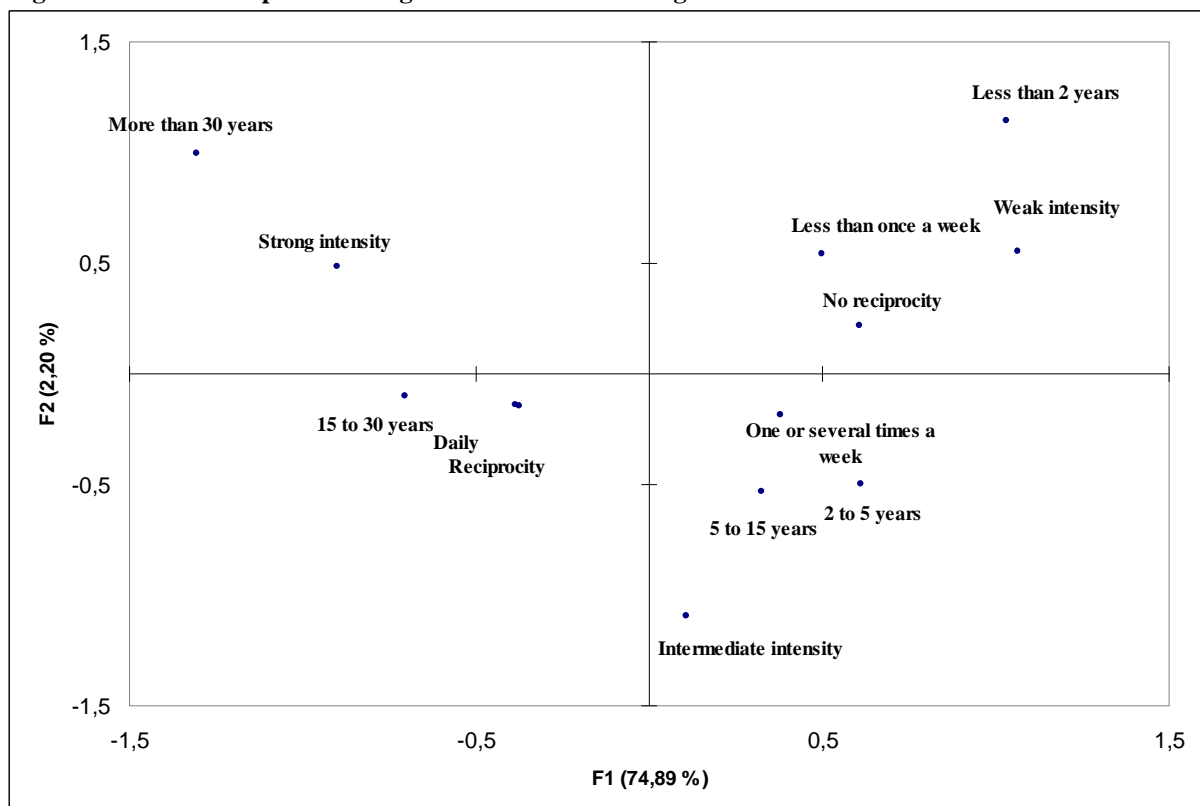**Figure A.2 :** **MCA plot of strength of ties variables categories**

Table A.2: **Average principal characteristics of activities and entrepreneurs by sectors (N=270; Bobo-Dioulasso, 2007)**

	Production	Trade	Catering	Other services	Total
	Sectors of activities				
Activities' Characteristics					
Monthly balance of primary incomes (KFCFA)	60	107	171	50	**85**
Monthly sales turnover (K FCFA)	246	657	696	147	**402**
Monthly wage bill (K FCFA)	45	11	34	20	**28**
Capital at resale price (K FCFA)	579	680	332	326	**521**
Activities' duration (years)	9,5	7,5	5,1	6,3	**7,6**
Commercial registration (%)	7	21	0	10	**11**
Entrepreneurs' Characteristics					
Age (years)	37,5	34,2	37,1	33,4	**35,5**
Household size (numbers of individuals)	8,5	7,8	6,9	6,0	**7,5**
Higher level than primary school (%)	14	23	42	34	**26**

Table A-3 : **Networks exchange content ; proportion of each resource by cluster***

Resources	USN	BNI	LN	DSN	Indistinct	All
	Networks					
Advices, information and ideas	**.204**	**.118**	.186	**.209**	.184	.180
Support in administrative relationship	**.100**	**.043**	.082	.062	.072	.074
Regular suppliers	**.081**	**.153**	.109	.094	.114	.109
Faithful customers	**.127**	**.188**	.185	**.203**	**.141**	.164
Cooperation or partnership	.117	**.146**	**.075**	.098	.119	.113
Financial support	.141	.157	.134	.116	.138	.139
Contact for recruitment	.102	**.057**	**.115**	.076	.099	.090
Start-up support	.128	.137	.113	.142	.133	.131

Notes: (*) The values that significantly differ from those of other clusters (independent samples t-tests) are in bold type in the table.

Table A.4: **Means and standard deviations for performance indicators and predictor variables**

Variables	Mean	S.D.
Value added (thousands FCFA)	116	133
Monthly earnings (thousands FCFA)	85	116
Inputs		
Log (capital input)	5.269	.740
Log (labour monthly input)	3.997	.676
Business characteristics		
Retail trade	.300	.459
Catering	.122	.328
Administratively registered activity	.110	.315
Activity has experienced a favourable economic situation this year	.318	.467
Entrepreneurs characteristics		
Primary education or more	.648	.478
Conducting this business at least since 5 years	.537	.499
Gender (female)	.159	.357
Ethnic group (Mossi)	.396	.490
Membership of one or several professional organisation	.160	.363
Networks' configuration		
Urban solidarity network	.267	.443
Linking network	.207	.406
Flexible business network	.170	.377
Dense solidarity network	.156	.363
Causality issues		
Network set up prior to activity's creation	.459	.499
Network set up after activity's creation	.230	.421

Table A-5 :   **Marginal effects of supporting significant networks (%)***

Endogenous variables	Networks		
	USN	BNI	DSN
Value added	+ 3,3	+ 3,0	+ 2,6
Earnings	+ 3,9	+ 3,4	+ 3,0

Notes: (*) Values in table indicates the impact on endogenous variables of the fact that entrepreneur supports such or such kind of network, all things being equal.