Social capital, trust and provision of local public goods

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Avertissement

Mis à part l'introduction et la conclusion de cette thèse, les différents chapitres sont issus d'articles de recherche rédigés en anglais et dont la structure est autonome. Par conséquent, des termes "papier" ou "article" y font référence, et certaines informations, notamment la littérature, sont répétées d'un chapitre à l'autre.

Notice

Except the general introduction and the conclusion, all chapters of this thesis are self-containing research articles. Consequently, terms "paper" or "article" are frequently used. Moreover, some explanations, like corresponding literature, are repeated in different places of the thesis.

Table des matières

Introduction

The main purpose of the present dissertation is to study the role of social capital in the ability of local communities in developing countries to undertake successful collective action and produce local public goods by themselves. This dissertation is motivated by recent changes in the economic development paradigm which have accorded greater importance to social capital and the participation of the local population. I will outline the context and objectives of the dissertation before presenting the methodology and the main results.

From structural adjustment to empowerment

In recent decades, the approach to development was mostly based on macroeconomic policy. In the 1950s and 1960s, for example, development strategies were dominated by the import substitution and industrialization (ISI) approach, which is based on the premise that a country should attempt to reduce its foreign dependency via the local production of industrial goods. The idea was to develop certain industries which have a strong ripple effect on the rest of the economy, and to produce locally goods which had previously been imported. The country in question should therefore become able to produce by itself what it had previously imported, and the policy was supposed to put it in a position of indepen-

dence from other countries from which it had imported. The ISI approach was gradually shown to have limits in the 1970s, leading it to be seriously called into question in the 1980s.

In the mid-1980, the term the Washington Consensus was used to describe a standard reform package of 10 policy prescriptions which emphasized macroeconomic stabilization, privatization and free market development. The implementation of these structural adjustment programs (SAPs) proved politically difficult for most governments, many of which chose to make no serious attempt to meet the programs' conditions.

More recently, at the end of the 1990s, development policies shifted to favoring more "*bottom up*" or micro approaches, reflecting a radical shift in the previous way of thinking about development problems. One prominent example is the World Bank's concerns with incorporating the voices of the poor by introducing the concepts of empowerment and community-driven development after the World Development report 2000/1 "*Attacking Poverty*". This shift in the development paradigm was mostly motivated by the criticism leveled at SAPs for example of not paying sufficient attention to the social dimension of development and local particularities. Community participation and empowerment now appear in the mainstream agenda of the debate over development and have become the objectives of governments and international development agencies.

Empowerment is defined as "the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives" ((Narayan, 2002)). The empowering approach underlines three different strategies for the provision of effective services to the poor. The first is to encourage the decentralization of the provision of local public goods and services, including health care,

education, water, roads, and basic infrastructure around local territorial units such as districts, municipalities, or communes. The second is to achieve greater citizen participation at the local level in order to develop a better service-delivery partnership. The third is to reinforce local organizational capacity, which refers to the ability of communities to work together, organize, and mobilize resources to solve problems of common interest and to undertake autonomous collective action.

The limits of collective action

However, the existing theoretical literature is pessimistic about the ability of local communities to achieve collective action, due to the temptation to free-ride. A group member benefits from the efforts of all other group members, and all can benefit substantially from collective action. Self-centered, rational and selfish agents will engage in a cost-benefit calculation. Their interest is in limited personal participation, as this is costly, but enjoying the benefits gained from the efforts of those who have become involved. This behavior, if generalized, leads to the lack of any collective action. For Olson (1965), individuals will not engage in collective action without coercion or selective incentives. Olson's conclusion is however called into question in the economic-institutional viewpoint. Ostrom (1990), for example, while recognizing that the temptation to free ride is a real phenomenon, emphasizes that this temptation is not sufficient in practice to destroy any chance of achieving effective collective action. While some communities are unable to carry out joint activities, they are many examples of communities which do engage successfully in collective action to manage local resources (Ostrom, 1990 ; Khwaja, 2005)

Social capital and collective action

One of the factors highlighted in this literature as explaining the success of collective action is the importance of community shared norms and rules such as trust and altruism in encouraging cooperative behavior. These features of social relations and social norms, which are also referred as social capital (Putnam, 2000), are recognized as key determinants of economic performance (Ostrom, 1990). In the well-known work of Coleman (1990) and Putnam (2000), this is used convincingly to explain societal evolution. Putnam adapted Coleman's approach to extend the concept of social capital to the analysis of the social dynamics of communities and nations, especially in his pioneering work on the relationship between institutional performance and density associations (an indicator of social capital) in Italian regions in 1994 and the United States in 2000. This work inspired much subsequent research using social capital to explain such diverse phenomena as the creation of human capital, democracy in some institutions, poverty reduction, etc. NGOs and governments, as well as popular discourse, now regularly refer to social capital to explain many aspects of social life. For instance, the World Bank has initiated a program of research on social capital, the Social Capital Initiative. By adopting the concept of social capital, the World Bank aims to find a useful instrument to improve the effectiveness of development projects.

Outline of the thesis

The main purpose of the present dissertation is to study the role of social capital in the capacity of local communities in developing countries to undertake collective action and to produce local public goods by themselves. This dissertation is composed of three parts. The first part reviews the literature on collective action, trust and provision of local public

goods. The second part analyses the role of social capital at the individual level using an experimental methods (Chapters 3 and 4) and third part analyses the causal effect of social capital in the ability to manage local public at district level using econometric method (Chapters 5 and 6).

The analysis is carried out using two distinct approaches.

The first approach uses an original mixture of survey and experimental data on trust from four villages in Senegal to assess trust measurement method and the decision to participate in some activities of provision of local public goods. The chapter 3 investigates the extent to which different (survey-based measures and experimental measures) of trust are connected to a community's ability to produce local public goods. The aim is to clarify what trust measurement method is better in explaining how heterogeneous individuals manage to engage in joint activities despite the associated problem of free-riding. The results show that trust, as measured by survey questions, has poor predictive power, while the results from a simple trust game are much better predictors of public-goods production. The chapter 4 applies latent-trait analysis to measure trust and then compares the results to trust behavior in experiments. A score based on both individual responses and the properties of the question asked is first constructed in order to pick up each individual's latent trait. The validity of this measure is assessed by establishing the extent to which it predicts experimental behavior. Results show a positive and significant relationship between survey trust and trust behavior in experiments.

The second approach investigates the causal impact of trust in the quality of public goods produced at district level in Africa. The objectives are threefold : (I) to examine the determinants of the production of communities ability local public goods using a large

database to get "*the picture*" (II) to assess the relative importance of social capital and ethnic diversity and (III) to use identification strategies that enable us to establish causality. For this purpose, the round 3 of Afrobarometer data is used. To circumvent endogeneity problems caused by the co-variation of trust and the quality of public-good governance an inherited-trust from ethnic groups' variable is used. This strategy follows the same logic as in Algan & Cahuc (2010) and Uslaner (2008b), who show that trust is transmitted from generation to generation. Using information on the historical settlement patterns of ethnic groups in Sub-Saharan Africa, two measures of inherited trust are considered : trust in neighbors, and inherited generalized trust. These two inherited-trust measures are used to test the causal impact of trust on the quality of public-good governance across a large number of districts in sub-Saharan Africa.

In the chapter 5, the role of social capital and ethnic divisions in determining access to basic health care is tested. The measure of local trust (level of trust in neighbors) is shown to have a *causal* impact on household health-related behaviors, community access to improved water and the quality of health centers. A rise of one percent in localized trust reduces doctor absenteeism by .421 percent, waiting time by 0.57 percent, illegal health payments by 0.512 percent, and the lack of attention by medical staff by 0.738 percent. Ethnic fragmentation and generalized trust play only a marginal role. The chapter 6 wishes to highlight the importance of social capital to promote better schools in Africa. The results show that that a one standard deviation increase in the local level of trust increases the quality of local public goods by .17 to .39 of a standard deviation. Once we control for trust, ethnic fragmentation plays only a marginal role.

The following sections summarize details of the content of each chapter of the thesis.

Elinor Ostrom and the commons

This chapter presents a survey of Nobel Price Elinor Ostrom's work on governance of commons. This chapter begins by redrawing the academic route of Ostrom. In the second part, it shows how she successively used various methods of investigation throughout a route which leaves the meticulous study of multiple concrete situations to evolve towards the design of public policies for big international bodies. The conclusion describes the implications she draws from her work so as to contribute to a renewal of rational choice theory.

Trust and Economic Performance : A Literature Review

This chapter examines the aspects of recent research on the role of trust in economic development. It begins by looking at the different interpretations given to this elusive concept that is trust, and the different ways of measuring trust. The analysis then focuses the empirical literature on the role of trust in explaining economic performance. Finally, the effect of cooperation in the provision of public goods is analyzed by focusing on African ethnically-diverse communities.

Trust as a Proxy for the Ability to Produce Local Public Good : Testing Different Measures

This chapter investigates the extent to which different measures of trust are connected to a community's ability to produce local public goods. If this ability depends critically on members' willingness to act collectively, different measures of trust can be tested. This chapter is thus interested in clarifying what trust measurement method is better in ex-

plaining how heterogeneous individuals manage to engage in joint activities despite the associated problem of free-riding. For this purpose a version of trust game in which subjects are matched with a random anonym member of the community to a number of survey trust questions. Results show that trust, as measured by survey questions, has poor predictive power, while the results from a simple trust game are much better predictors of public-goods production. More particularly, an one unit increases in the amount sent in trust game increases the odds of participation in *Tontine* by 2,3%, the odds of participating in *Credit Association* by 2.6% and the odds of participation in *Animation* activities by 1.7%. when endogeneity is not accounted for.

Measuring Trust as a Latent Personality Trait : Validity and Relationship with Behavior in the Trust Game

This chapter investigates whether trust can be measured as a latent trait, and how this relates to other trust-measurement methods. For this purpose, a class of latent trait model formulated by Muraki (2009), the Generalized Partial Credit Model, is used to construct the latent trait. The choice of this method is justified by a number of advantages over other methods. Under this approach, a score is constructed in order to measure the latent trait in each individual, and the trait level estimates depend on both individual responses and the properties of the questions that were administered. The analysis begins by a construction of a score based on both individual responses and the properties of the question asked in order to pick up each individual's latent trait. The validity of this measure is assessed by establishing the extent to which it predicts experimental behavior. The results show a positive and significant relationship between survey trust and trust behavior in experiments.

Are Trust and Ethnic Divisions Important for Access to Basic Primary Health Care in Sub-Saharan Africa ?

This chapter uses Afrobarometer data to test the role of social capital and ethnic divisions in determining access to basic health care. The level of social capital is captured by the average level of trust, and ethnic divisions via the index of ethnic fractionalization proposed by Easterly & Levine (1997). This chapter skirts any reverse-causality problems between trust and the quality of public goods, and omitted-variable bias due to endogenous ethnic sorting, by the use of historical data on the settlement patterns of ethnic groups in Sub-Saharan Africa. This data provides measures of inherited trust which is used an instrument for trust, and a measure of initial population density in the ethnic homeland, which is used to instrument ethnic divisions. The measure of local trust is shown to have a *causal* impact on household health-related behaviors, community access to improved water and the quality of health centers. Results show that a rise of one percent in localized trust reduces doctor absenteeism by .421 percent, waiting time by 0.57 percent, illegal health payments by 0.512 percent, and the lack of attention by medical staff by 0.738 percent. Ethnic fragmentation and generalized trust play only a marginal role. This chapter also appeals to a set of other controls to see whether a selection effect is at work. The effect of trust is robust and is consistent across various model specifications and the inclusion of additional controls. OLS estimation is shown to underestimate the effect of trust on the quality of public goods. This may be attributed to measurement error in the trust variables and the existence of local-area clubs which positively affect the quality of public goods but are negatively correlated with trust.

What drives quality of schools in Africa ? Disentangling social capital and ethnic divisions

Limited governmental resources in Africa mean that communities are often in charge of management of schools. Two theories of African community's ability to engage in collective action and improve quality of schools have emerged. Cross-country evidence underlines ethnic divisions as one key limit to collective action in Africa. On the other hand, field work suggests that social capital (i.e. the community's ability to engage in collective action or establish shared norms) is the main driver of the quality of local public goods. This chapter uses Afrobarometer data to test the role of social capital and ethnic divisions in determining the quality schools. The level of social capital is captured by the average level of trust and ethnic divisions via the index of ethnic fractionalization. We skirt reverse causality problems between trust and quality of public goods by using historical information on the settlement patterns of ethnic groups in Sub-Saharan Africa : this yields measures of ethnic inherited trust which we use as instrument for trust. To address concerns over endogenous residential sorting, we instrument ethnic fractionalization by the initial population density of ethnic historical homelands. Results show that a one standard deviation increase in the local level of trust increases the quality of local public goods by .17 to .39 of a standard deviation. Once trust is controlled, ethnic fragmentation plays only a marginal role.

Première partie

Social capital, trust and collective action : A Literature Survey

LITERATURE SURVEY

Chapitre 1

ELINOR OSTROM AND THE COMMONS

1.1. Introduction

On October 12th 2009, the Nobel Prize in Economics was awarded to Professors Elinor Ostrom and Oliver Williamson for their work on "*Economic Governance*". Elinor Ostrom therefore became the first woman to be awarded the Nobel Prize in Economics. In the words of the committee, she was recognized for having shown how common property can be effectively managed by users' associations and thus having "*challenged the conventional wisdom that common property is poorly managed and should be either regulated by central authorities or privatized*". Ostrom's work is still poorly-known in the community of academic economists. There are at at least two reasons for this relative ignorance. First, the work of Elinor Ostrom is often categorized as falling within the domain of Political Science. In addition, more profoundly, the methods used by Ostrom throughout her career have not always corresponded to the canons in force among economists. Specifically, what is special about her work is her ability to call on research results emanating from methods that are only rarely combined in practice, such as case studies, experimental economics and game theory. The current article aims to provide an overview of Ostrom's work over the last fifty years. We begin by tracing her academic and professional career. In the second part, we show how Ostrom appealed to a number of different methods in turn, always with the aim of analyzing public goods.

We will see that Ostrom managed to use successively a variety of different methods of investigation in a career that started from the careful study of a number of practical situations and which developed into public-policy recommendations for international organizations. In the conclusion, we discuss the implications she derived from her work as a

contribution to the renewal of theories of rationality.

1.2. Itinerary academic

Elinor Ostrom was born in 1933 in Los Angeles, in the middle of the Great Depression. After her secondary schooling at Beverly Hills High School, she joined the University of California at Los Angeles (UCLA) to study political science. She obtained a BA in political science in 1954 before moving to Boston, where she worked in a Law firm. Three years later, Ostrom returned to Los Angeles to pursue her university studies, where she obtained her Masters in 1962. She finished her education at the University of California in 1965, with the presentation of a PhD thesis entitled "*Public Entrepreneurship : A Case Study in Ground Water Management*" ((Ostrom, 1965)). The obtention of a PhD opened the doors of Indiana University where she joined her husband Vincent Ostrom and began her academic career. She was subsequently appointed Professor of political science in 1974, then director of department between 1980 and 1984, before assuming the Arthur F. Bentley Chair of Political Science

1.2.1. Research Experience

Throughout her career, Ostrom has devoted her research almost exclusively to the study of the collective management of resources. This began as part of her PhD thesis, in studying how users' associations developed institutional arrangements to manage the intrusion of saltwater into groundwater in Los Angeles. After this first experience, she was asked to carry out research on the organization of the police in Indianapolis ; the findings of this research led her to question the effectiveness of centralized police stations, which

will expand her analysis in the field of collective action. In 1973, eager to move beyond disciplinary boundaries, she founded with her husband, the "Political Theory and Policy Analysis" workshop to provide an intellectual framework for her research, which aimed to identify the most appropriate institutions to effectively manage resources such as water or forests. Rather than look for rules which would apply regardless of context, much of her intellectual effort was dedicated to the identification of the contextual elements which had to be considered for the development of operating principles.

Ostrom was subsequently at the head of many research projects for various U.S. administrations and international organizations, where her contributions were informed by her experiences and information from many American, Asian, African and European countries. These numerous case studies later enabled her to develop a comprehensive research program in Sociology, Anthropology and Economics which resulted in the publication of her 1990 book "*Governing the Commons*". Here the results of her research led her to highlight the existence of a third way between the market and the State for the management of a common resource. She demonstrates via many examples that local communities can by themselves manage to establish an efficient management structure, without having recourse to either public authorities or the market. This is a point of view that she does not hesitate to openly endorse : "*if this study does nothing more than shatter the convictions of many policy analysts that the only way to solve common pool resource problems is for external authorities to impose full private property rights or centralized regulation, it will have accomplished one major purpose*". In 1992, the United Nations Food and Agriculture Organization (FAO) entrusted her with a research project on forest resources, and since then she has speny much of her time in the International Forestry Resources and Insti-

tutions (IFRI) program. As a specialist in the role of institutions in Economics, Ostrom founded and directed the Center for the Study of Institutional Diversity at Arizona State University.

In addition to her research, Ostrom has held senior positions in a number of prestigious organizations. She has, amongst others, chaired the American Association of Political Science. The accumulation of academic honors should not obscure the fact that Ostrom is among the few intellectuals who has been able to participate in the widespread implementation of their ideas.

1.2.2. The works cited by the Nobel committee

The award of the Nobel Prize in Economics to Ostrom marked the consecration of her work on governance. Based on numerous case studies, she offered an original approach to the governance of common resources and demonstrates that communities are able to govern themselves and avoid the over-exploitation of resources. The problem of the over-exploitation of common resources, now well known in economics, was first analyzed by Warming (1911) and Gordon (1957) but was popularized by a biologist, Hardin (1968), as "*the tragedy of the commons*" in an article in Science. The classic problem of "*the tragedy of the commons*" is that every user of a shared resource, if he pursues only his individual interest, will try to use the resource to maximize their individual gains, which increases the cost for the entire community. It is this tension between individual and collective interests which occurs in so-called social dilemmas (such as the prisoner's dilemma). Hardin gave the example of a common pasture where every farmer's interest is to increase the number of their own animals, in that the field does not belong to her and the user cost is shared

by everyone. The combination of individual interests then leads to over-exploitation and resource degradation. Two solutions have been proposed by Economists for this tragedy.

The first proposes the privatization of common resources. This solution is based on the idea that with the conversion of common resources into private property, owners will be encouraged to be rational, in that they will internalize any externalities. An alternative, often associated with Pigou (1920), is to entrust the management of the resource to the State. The State will collect taxes, called Pigouvian taxes, and define access rights. Coase (1960) however has contested this solution, that he considers as purely theoretical. According to Coase, the introduction of a Pigouvian tax is only effective in the absence of transaction costs, but in practice any form of governance will be associated with transaction costs that may be particularly high.

In "*Governing the Commons*", Ostrom (1990) proposes a third way that consists in allowing users to create their own systems of governance. Ostrom, via many case studies, shows that many communities worldwide manage in practice to avoid the tragedy of the commons, while at the same time the ownership of these assets is neither private nor public, but rather collective. In particular, these communities are able to manage resources sustainably by creating small-scale institutions which are suited to local conditions. Conversely, she also identifies cases in which the arrangements instigated failed to curb the over-exploitation of common resources. This led to a research program into the nature of the institutional arrangements which are the most likely to promote effective management, a program to which she has remained committed throughout her life.

1.3. Methods and results

One particular feature of the work of Ostrom is to have successfully crossed disciplinary boundaries. She has appealed to a wide range of disciplines (economic theory, political science, evolutionary psychology, cultural anthropology, and so on) and has employed a number of different methods (amongst which laboratory experiments, field studies and evolutionary game theory) to analyze collective action. In its initial phase, her work was essentially inductive and willingly adopted "bottom-up" reasoning, i.e. she paid particular attention to the complexity of each situation and did not hesitate to enter into the details of the institutional arrangements which were cobbled together by communities. The theoretical development came only later as she brought together the vast amount of information she had gathered. This is classic social science, perhaps more in sociology or anthropology than economics, but the importance of Ostrom's contribution is measured by her ability to effectively identify the key points in the successful management of public goods. The analytical framework that she proposes will likely prevail and prove robust to criticism.

1.3.1. From the field to theory : the conditions for the successful management of the commons

Ostrom's research project began with the study of the performance of groups of Police officers in various districts in the Indianapolis suburbs. Other similar projects followed, in the neighborhoods of Chicago and St.Louis, which opened the door to large-scale comparisons across eighty Metropolitan areas. The conclusion from this series of analyses was that the police departments which served small and medium districts operated more efficiently, and often at lower cost, than the police districts serving larger districts. "*The presumption*

that economies of scale were prevalent was wrong ; the presumption that you needed a single police department was wrong ; and the presumption that individual departments wouldn't be smart enough to work out ways of coordinating is wrong". [1] Ostrom showed that, in practice, the mainly theoretical idea of pervasive economies of scale is undermined by the careful analysis of concrete situations. She spent over fifteen years analyzing the police, but has not hesitated, as shown by the citation above, to take a clear position.

Ostrom subsequently considered other case studies that enabled her to conclude in her first book, "*Governing the Commons*", that the management of common resources by users yields better results than standard theory would predict. This work includes the analysis of communal forests in Japan and Switzerland, irrigation systems in Spain, the Philippines and Sri Lanka, groundwater management in California, and fishing in Turkey and Scotland. In Sri Lanka, the hierarchical organization inherited from the traditional system of local politics had produced an unfair system and the inefficient distribution of water. Ostrom shows how the development of new collective organizations among farmers significantly improved the situation by changing incentives and providing a monitoring system, improving the implementation of collective decisions regarding water theft from irrigation systems.

What is striking about Ostrom's work is both the number and diversity of the situations that she analyzes. Over a number of decades, she hosted a workshop meeting once a week which reviewed concrete examples of the management of public goods. The systematic pattern in her work was made possible by the development of a group of individuals who analyzed her ideas.

1. (Ostrom & Whitaker, 1997), pp : 48-76.

The fundamental principles for the successful management of the commons

"Governing the commons" is probably Ostrom's most important work. Throughout the text, she constantly switches between the detailed descriptions of specific cases and general principles. She identifies eight principles for the successful management of the commons, which provide the foundation for the theory of the management of public goods. The art of Ostrom lies in her ability to base each of her assertions on various examples of how the adhesion (or not) to one of her principles, suffices to reverse the situation. We briefly restate these principles :

i. Access rights must be clearly defined

ii. Benefits should be commensurate with the costs borne

iii. Procedures must be established to make collective choices

iv. There must be rules of supervision and monitoring

v. Gradual and differentiated sanctions should be applied

vi. Mechanisms of conflict resolution should be established

vii. The state must recognize the organization in place ;

viii. The whole system is organized at a number of levels

These principles go beyond the usual framework of economics to include legal, social and political elements. While the first two principles should seem familiar to economists, the application of rules of supervision and monitoring, as well as the establishment of mechanisms of conflict resolution, spring rather from socio-legal considerations.

These principles suggest that institutional structures should be managed in a polycentric system (with nested institutions). Principles 1 and 2 govern the rules for individual use, while principles 3, 4 and 5 are rather of a collective nature. The seventh principle shows that the State affects collective action, without being directly a management actor.

From the view of economic theory, the most important point may be the importance of allowing the actors to interact to jointly develop their own operating rules. As Ostrom rightly points out, economic theory does not say much about the type of rule that can emerge from discussions between individuals belonging to the same community. In addition, communication between individuals is a key factor in the development of trusting relationships between them. Again, current economic theory provides little guidance to describe the procedures governing the emergence of trust.

1.3.2. From theory to public action

Ostrom was one of the first researchers to use experimental economics to model and evaluate the impact of a change in the rules governing the management of commons. In this sense, she notes that "*the use of economic experiments has enhanced the already diverse knowledge from theoretical and field sources of when and how groups can solve the problem through self-governing mechanisms*" (Cardenas & Ostrom, 2001). In one of her typical experiments, a number of subjects interact for multiple periods without knowing exactly which will be the last. In each period, each subject can contribute to a public good. The marginal cost of each individual contribution exceeds its marginal benefit but is smaller than the total profit. In this context, a rational and selfish individual will not contribute to the collective good. One of the main features of these experiments is the introduction

of punishment opportunities. In one treatment, each subject is informed of the actions of other subjects in the previous round and can selectively punish each opponent. This punishment is costly. Ostrom and her colleagues note, however, that many subjects used the opportunity, despite its cost to them, to punish deviant behavior. Moreover, these punishments were much more effective if subjects were allowed to communicate with each other than if they are not, which confirms the results obtained in the field. Finally, institutional arrangements were simple enough in practice to achieve the good management of public property, including in situations where theories based on the assumption of selfish behaviour predicted the total destruction of the public good. The results from her experiments were published in her book co-authored with Gardner and Walker, "Rules, Games and Common-Pool Resources" (1994). These experiments were followed by others, including Masclet *et al.* (2003), Schlager (1994), Kosfeld & Ried (2009) and, regarding the possibility of sanctions in non-repeated games, Fehr & Gächter (2000). This work has confirmed Ostrom's findings : many individuals are willing to incur a financial loss to punish deviant behavior.

Methodologically, the use of experimental economics allows us to study the response of communities to changes in their institutional environment. In this way experimental economics can switch from a description of cooperative situations - through case studies - to the study of potential measures to improve current practices.

An analytical model : Institutional Analysis and Development (IAD)

The IAD model has been used for over three decades as a lens through which to analyze

common management situations. It appeared for the first time in 1982 in Kiser & Ostrom (n.d.) ; the most explicit description of the IAD model was set out in 1994 by Ostrom in her book "Rules, Games and Common-Pool Resources" (Ostrom, 1994).

The analysis begins with a conceptual unit called the action scene (action arena), involving actors interacting in a social situation called an action (action position) (figure 1). An action situation refers to the social space where participants interact with a variety of preferences, exchange goods and services, solve problems, dominate, or fight (Ostrom, 2005). After the delimitation of the initial structure, Ostrom distinguishes external factors that affect the scene of action : "*The IAD framework is thus a general language about how rules, physical and material conditions, and attributes of community affect the structure of action arenas, the incentives that individuals face, and the resulting outcomes*". The factors affecting the structure of an action scene then include three sets of variables which are the characteristics of the physical world, the community characteristics and rules.

- The biophysical world in which the action is related (e.g. a fishery or a forest) is one of the critical variables affecting the structure of the action situation. Clearly the issue of global warming is not the same as managing a pond.
- The main attributes of a community that affect the arena of action : the norms of behavior generally accepted in the community, the degree of common understanding, the homogeneity of the preferences of those living in a community, the size and composition of the community concerned, etc.
- The rules are the main economic instrument, as they are subject to change at short notice. More importantly, the rules are often identified by the actors themselves as the main vehicle of change. Any conflicts are primarily dealt with by the players

establishing new rules.

The IAD model should probably be understood as an operational framework providing the basis for an assessment of public-good management problems. In other words, the purpose of the IAD is not to propose a theoretical model or a simplified description of what happens in practice in the field. The contribution of the IAD model is to establish a language and point towards likely problems. The evaluation of a scheme as simple as that presented above must be carried out in terms of its practical ability to guide the people in charge of an evaluation. In this sense, the IAD model has been a success in that it is the base matrix for the analysis of collective goods. Its use is strongly recommended by many international bodies (for examples of the use of the IAD model see : Tang (1992) ; Lam (1998) ; Ostrom (1992) ; Oakerson (1992))

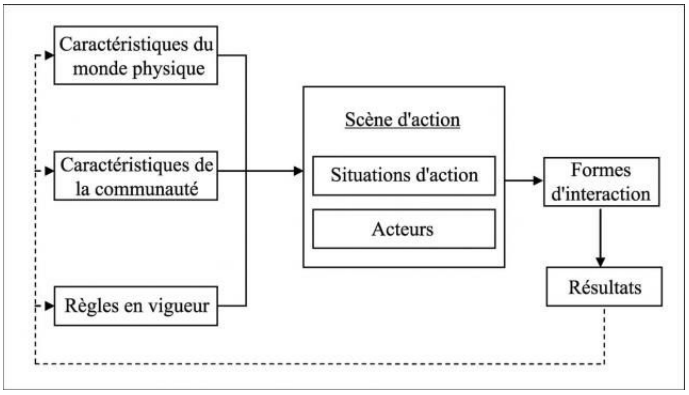


FIGURE 1.1 – Figure 1. IAD Model ((Ostrom *et al.*, 1994))

1.3.3. Conclusion : towards a new vision of rationality ?

For Ostrom, the object of collective action is the resolution of social dilemmas resulting from the management of public goods. Ostrom recognizes that the temptation to free ride is observed in practice, but emphasizes that these negative trends are not sufficient to destroy

all possibilities of achieving effective management. Ostrom provides a frontal criticism of the theories of rationality often used in economics to describe individual behavior. For her, the "*assumption of the first-generation theories has been repeatedly rejected by empirical research conducted in the field and the experimental laboratory*" (Ostrom, 1998). Individuals do not calculate a comprehensive set of policies for all situations they encounter, and in general in few situations in life do we have information on any possible actions that can be taken, all the results that pertain or may pertain, or all of the the strategies that individuals can follow. For Ostrom, "*the only reasonable assumption to make about the discovery and calculation processes employed is that appropriators engage in a considerable amount of trial-and-error learning*" (Ostrom, 1990). The work of Ostrom can be seen as a challenge to theories of rationality. She does not reject any attempt to formalize human behavior, but rather points out the shortcomings of current models. Two examples are emblematic in this regard.

- *The role of communication* : For Ostrom, communication is fundamental in collective action. Direct communication is the foundation of successful collective management. This builds trust and allows for common rules. What really matters in these verbal exchanges still largely escapes contemporary theory, although it is widely recognized in the field (for a more detailed discussion of this point see (Hollard, 2004).

- *The importance of institutional innovation, rules and sanctions* : According to Ostrom, "*In all known self-organized resource governance regimes that have survived for multiple generations, participants invest resources in monitoring and sanctioning the actions of each other so as to reduce the probability of free riding*" (Ostrom, 1990). The fact that sanctions

and monitoring should be introduced, to prevent the unauthorized use of the resource, is not in itself new or surprising. What is more surprising is that the monitoring burden is borne by the actors themselves. Monitoring activities then themselves become a collective good.

The fact that the actors themselves provide oversight and not the State is fundamental. Ostrom has not hesitated to assert, for example during the speech given when receiving the Nobel prize, that the involvement of stakeholders in monitoring activities is more important than the definition of property rights over the resource. The major theories of social organization, for example putting the State or the market at center stage, are often based on a scheme in which each player is faced with exogenous institutional arrangements. Actors have not contributed to the Laws or prices that they face. Small groups can, however, act collectively to generate their own institutional arrangements. For Ostrom, the nature of the rules that will be implemented is less important than the involvement of stakeholders in the development and monitoring of the rules. The fact that there is no complete theory of the self-management process, should not obscure that there are contexts in which they turn out to perform better than the better-conceptualized organization.

Chapitre 2

Literature Survey Trust

LITERATURE SURVEY TRUST

2.1. Introduction

Understanding the causes of economic development and the origins of income inequality is probably one of the most important concerns for development economists. Economists have for a long time underestimated the role of cultural and social factors, focusing only on formal institutions to explain countries' differences economic performances. However, in recent years attention has gradually turned to the deeper of the cultural and historical causes of underdevelopment [Knack & Keefer (1997), La Porta *et al.* (1997) Tabellini (2005), Guiso *et al.* (2007a)]. Economists' interest in these cultural and social factors was almost certainly motivated by the resurgence of work on social capital, and the empirical evidence of a positive correlation between trust and economic performance. Since the seminal work of Coleman (1990), Putnam (1993) and Fukuyama (1995), many other authors such as Knack & Keefer (1997), La Porta *et al.* (1997) have set out to show that trust is a key component of many economic outcomes such as investment and economic growth. However, despite the burgeoning literature on the economic consequences of trust, the theoretical and empirical foundations of the relationship between trust and economic performance have often remained controversial. Economists were for a long time reluctant to use the notion of trust, as it is hard to define and, thus, to measure.

Recently, significant progress has been made in this literature, which now assigns a central role to trust in the mainstream economy, especially for the explanation of economic growth (see Algan & Cahuc (2013) for a review). Following the paper by Durlauf & Fafchamps (2005) which highlighted the conceptual and statistical shortcomings related to the notion of trust in the economic literature, progress has been made in the identification

methods for the role of trust in economic performance, confirming a positive correlation. This observation has been reinforced recently by a series of contributions going beyond the simple correlation between the two variables to document a causal effect of trust on growth (Algan & Cahuc (2010)e) and has developed strategies to identify the channels through which trust can affect economic performance (Guiso *et al.* (2007a), Tabellini (2008)).

This chapter examines these aspects of recent research on the role of trust in economic development. We begin by looking at the different interpretations given to this elusive concept that is trust, and the different ways of measuring trust. We then analyze the empirical literature on the role of trust in explaining economic performance. Finally, the effect of cooperation in the provision of public goods is analyzed by focusing on African ethnically-diverse communities.

2.2. The definition and source of trust

Despite the burgeoning associated literature, trust remains an elusive concept, and it is difficult to provide a precise definition. There are a plethora of definitions are used in the literature. Tara (2007), for example, has identified more than nineteen definitions of trust in the sociology, economics and political science literature. However, most trust definitions agree, amongst others, on two important elements : trust is mutually beneficial (a situation in which all parties trust each other is more Pareto-optimal than a situation without trust), and trust includes the risk of betrayal or exploitation. According to Coleman (1990), "*a person trusts if he puts voluntarily some resources available to another party without any legal commitment to it, but with the hope that the deed of trust to pay*". Another definition is given by Fukuyama (1995), for whom "*trust is the expectation that arises*

within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of other members of that community...". For Arrow (1972), trust is the "lubricant" at the base of the operation of the social system and its efficiency. As such, any definition of trust should include a social dimension. Along similar lines, Zucker (1970) defines trust as a set of social expectations shared by those involved in an economic exchange.

Based on an extensive literature review in the area of trust, Nannestad (2008) shows that there are two streams of research. On the one hand, there is research based on micro-sources of trust, e.g based on aspects of interpersonal relations [Glaeser *et al.* (1999), Fehr *et al.* (2003), Beugelsdijk (2006), Sapienza *et al.* (2007)] ; on the other hand there is work based on macro-social sources, e.g. on institutional arrangements, culture or historical factors as the determinants of trust [Knack & Keefer (1997), Nunn & Wantchekon (2011), Fukuyama (1995), Tabellini (2005), Guiso *et al.* (2007a), amongst others].

2.3. Trust-measurement methods

Generally trust is measured using survey questions or experimental methods. The objective of this section is to present a broad description of such trust-measurement methods

2.3.1. Survey questions

Survey measures of trust consists in asking people directly about their trust attitude with respect to others, such as "most people", "neighbors" or "strangers". A widely-used survey question is that in the World Values Survey (WVS) which is "*In general would you say that most people can be trusted or that you must be very careful in dealing with people ?*".

This question has been asked in many surveys and appears in many large databases (e.g. the U.S. General Social Survey, the European Values Survey and the World Values Survey. However, these questions to measure trust have led to a number of criticisms, of which two are particularly salient. The first is the radius of the trust question : who are "most people" ? And the second is whether the GVS question is an measure of quality of institutions or an aspect of culture.

2.3.2. Who are "most people" ?

The first criticism made by authors such as Glaeser *et al.* (2000), Hardin (2002) and Nannestad (2008), is that the WVS question is too abstract and does not provide a good measure of trust. Knack & Keefer (1997) were the first to use the WVS method to measure the impact of trust on economic performance , and were the first to recognize that "*the issue of trust is somewhat ambiguous with respect to which most people respondents have in mind*". This is a challenge to work using the WVS question as an indicator of confidence : the trust measure is somewhat ambiguous with respect to the radius of people who are involved in the expression "most people" used in this question.

Specifically, it is not possible to know what respondents have in mind when answering this WVS survey question. For example, Delhey *et al.* (2011) argue that rather than measuring "trust in people in general", the WVS survey question measures a radius of greater or lesser degree of trust in people like us. In addition, Sturgis & Smith (2010), considering the frames that respondents use in the WVS survey question, applied a protocol in which individuals respond to the GVS question, and afterwards are asked to indicate, in their own words, what comes to mind when formulating their responses. In contrast to the

widespread assumption that the WVS question measures a generalized level of trust, they found that a significant number of respondents said that they thought of people who are known to them personally. In addition, respondents who reported thinking about people who they know also report significantly higher levels of trust compared to those who say they thought of abstract categories such as "people in general". Their results suggest that the apparent differences found in different trust surveys derive, at least in part, from the heterogeneity of the interpretation given to the WVS survey question.

2.3.3. Institutions or culture ?

Two dominant points interpretations have been proposed in this literature. The first considers trust as reflecting current institutional quality, and the second as an aspect of culture. For instance, Beugelsdijk (2006) provides evidence that trust, as measured by the *WVS* trust question, is not a measure of culture but rather an indicator of well-functioning institutions. According to Beugelsdijk, there is a mismatch between trust, as theoretically conceptualized at the micro level, and how it is measured by the *WVS* trust question. In particular, the response to the *WVS* trust question only reflects the perception of well-functioning institutions. Therefore, the low levels of trust in poor countries could well reflect lack of functioning institutions rather than trust. This claim is consistent with a lot of the theoretical and empirical evidence proposed in the literature. This is for example the case in Rothstein & Stolle (2002), who used this question to defend the thesis of the institutional foundations of trust. They suggest that the degree of perceived fairness and impartiality in the institutions responsible for the implementation of public policies serves as an important foundation for the building and maintenance of high institutional trust,

which in turn spills over to influence generalized trust in others.

Counter to Beugelsdijk (2006), some work has proposed evidence refuting the claim that generalized trust reflects only the functioning of institutions. Uslaner (2008b), for example, has presented empirical evidence suggesting that there is only a weak link between trust and institutions. Uslaner (2008b)'s interpretation of the generalized trust question mirrors the conception of trust in Granovetter (1985) as a trust-based mechanisms of generalized morality. This moralized trust results from individuals' beliefs that most people have in common fundamental moral values. Granovetter (1985) considers this form of trust as the individual's predisposition which is transmitted from generation to generation. Uslaner (2008b) contrasts this form of trust to the strategic form. While trust is an impersonal concept, strategic trust reflects beliefs about how others will behave (beliefs based mostly on experience : see Guiso *et al.* (2007) and Algan & Cahuc (2010).

Tabellini (2008) interprets generalized trust as a culture of generalized morality "*through which historical factors in existing institutions affect economic development*". The work of Nunn & Wantchekon (2011) emphasized the role of the slave trade in changing internal standards of individuals that shaped external factors such as local institutions and social structures. They showed that the slave trade led to a culture of mistrust among Africans, and this culture of distrust is caused not only by the deterioration of legal and political institutions in the long term but also internal factors that caused changes in the cultural norms of ethnic groups that were exposed to the slave trade. The effect of these internal channels is about twice as large as that of the external channels.

Tabellini (2008) calls upon the results in Guiso *et al.* (2006), which show that trust of U.S. immigrants can be explained by factors relating to their homce country. This result

has been confirmed in recent literature, including Algan & Cahuc (2010) in the context of the United States. Uslaner (2008b), for example, using the WVS trust question between 1972 to 1996 as a measure of generalized trust, found that United States citizens whose ancestors came from high-trust countries tend to report higher levels of generalized trust. Algan & Cahuc (2010) use family values inherited from the home country as an instrument for family values amongst United States immigrants to explain the heterogeneity of the latter.

Note that the WVS survey question can be also interpreted both as measuring beliefs about the honest behavior of others, as well as how much the individual respondent values honesty and trustworthiness. So although what is precisely measured by the generalized trust question is debatable, it certainly has something to do with the ability to produce the key ingredients needed to undertake collective action, such as shared values or the ability to enforce collective norms.

2.3.4. Experimental measures of trust

The most widely-used experiment is the trust game, initially developed by Berg *et al.* (1995). In this game, two players, a sender and a receiver, are both given a monetary endowment (generally 10 dollars). The sender then has to decide whether to send part of his endowment to an anonymous receiver. The sender is informed that the amount sent is tripled by the experimenter on the way to the receiver. The receiver then decides how much of this money to keep, and how much to return to the sender. The amount sent by the first mover (the sender) is interpreted as a manifestation of trust and the second mover's transfer a manifestation of trustworthiness.

The emergence of experimental economics has allowed us to assess the motivations for trust behavior. In this literature, trust is motivated via either a preference-based component, such as altruistic, risky or inequality-averse preferences, or a belief-based component, e.g trust motivated by expectations about trustworthiness. The first component, considering that trust is motivated by social preferences, was principally defended by Cox (2004) and Karlan (2002). Using three games (a Trust Game, a Dictator Game and a modified Dictator Game) that allow him to discriminate trusting behavior in the trust game from behaviors that are not conditional on the actions of others, such as altruism or inequity aversion, Cox (2004) found that trusting behavior is not significatively different from unconditional behavior such as altruism and risk aversion. In other words, the behavior of players in the trust game is not only motivated by expected return also at least partly by altruism, risk and inequity-aversion. Furthermore, Karlan (2002) finds evidence that first-player behavior in the trust game measures the propensity to take risks. On the other hand, consistent with many definitions (Gambetta (1988), Barr (2004), Dasgupta (1988) and Coleman (1990)), Barr (2004) suggests that trusting behavior in experiments is motivated by expectations regarding trustworthiness. This approach, with trust being motivated by expectations about others's actions, is confirmed in a number of empirical findings in Barr (2004), who reports results from Zimbabwean villages in which trust behavior in experiment is largely explained by expectations.

The emergence of experimental methods has also helped researchers to test the validity of survey questions measuring trust. One key result, asi in [Glaeser *et al.* (2000), Ashraf *et al.* (2006) and Gächter *et al.* (2004)], is that the answers to such attitudinal questions are not correlated with the trust behavior observed in experiments. This lack of correlation

between the survey and experimental trust measures has, however, been challenged by Fehr *et al.* (2003), who find that trust attitude is correlated with behavior in the trust game in a sample of German households. Danielson & Holm (2005) found similar differences in the relationship between the two approaches to measuring trust in Sweden and Tanzania. These contrasting results cast doubt on the empirical findings regarding the relationship between trust and economic performance.

2.4. Trust and economic performance : some empirical evidence

During recent years, the rapid growth of work on social capital has gone hand-in-hand with renewed interest in trust. Social-capital researchers consider trust as a fundamental norm facilitating collective action and thus economic performance. Trust is considered as a important aspect of social capital. Trust is considered important for the economy as it facilitates cooperation and exchange, and thus growth. The idea is straightforward. In a society characterized by high levels of trust, people will spend less to protect themselves from potential opportunistic behavior. Researchers such as Fukuyama (1995), thus suggest that trust among economic actors is a key factor promoting economic performance. In particular, trust reduces transaction costs, promotes the respect of contracts [AKE (n.d.), Holmstrom (1979), Grossman & Hart (1986)], facilitates cooperation [Alchian & Demsetz (1972), Ostrom & Ahn (2003)], and encourages economic growth (Knack & Keefer, 1997)).

Putnam (1993), for example, analyzes the difference in the development of Northern and Southern Italy, and concludes that the stronger trusting relationships in the North

explain its economic success. Similar conclusions are reached by Knack & Keefer (1997) and Bornschier (2000). This has encouraged the emergence of a large literature appealing to trust to explain the pattern of economic development. Knack & Keefer (1997) was the first to use the WVS question to measure the impact of trust on economic performance. The WVS trust score over a sample of 29 market economies was shown to be correlated with economic growth. Knack & Zak (2003) added 12 more countries to the original Knack & Keefer (1997) sample and find a positive effect of trust on economic performance. These results have been confirmed in other work, such as La Porta et al. (1997), who use a sample of 1000 people in each of 40 countries to show that trust is correlated with other macroeconomic variables, such as government performance, civic participation, and so on.

2.5. Trust, ethnic division and cooperation in the provision of public goods

Many communities around the world are solely responsible for the provision of basic public goods and services, as they receive only very limited government resources. They are responsible for the building and maintenance of local parks, roads, community halls and health centers. In many cases, they are able to reach a consensus among members and to apply certain standards that allow them to produce and manage their local public goods and services. Not all communities are able to provide such basic public services and property to their members, as they often fail to reach the kind of agreements necessary to take collective action and produce public goods.

One important aspect of the social life in sub-saharan Africa is the importance of ethnic

divisions. Analyzing the production of local public goods thus requires us to pay particular attention to ethnic diversity (Miguel & Gugerty (2005), Glennerster *et al.* (2013)). Green (2012) notes that more than 177 ethnic groups, representing 43 percent of the African population, were split across two and sometimes three colonial borders. It is thus important to understand how communities composed of a number of ethnic groups can overcome their difficulties to reach the type of agreements necessary to undertake collective action.

Much work in developing communities has demonstrated the important role of certain beliefs, attitudes and social norms in these areas, where they can substitute for the formal institutions that are often absent. Trust is an essential ingredient in the promotion of trade, and can support collective actions by allowing for the resolution of conflicts between competing interests and reducing the fear of free-riding.

Miguel & Gugerty (2005) reports that in Matumbai's primary school in Kenya, parents refused to participate in fund-raisers and communities in school meetings due to a lack of trust between ethnic groups. Furthermore, in ethnically-diverse Kenyan villages, where community cohesion and trust are lacking, informal sanctions are usually ineffective in pressuring individuals to contribute to public goods. Trust among community members is then considered as an essential ingredient facilitating the success of collective action and explaining different community outcomes in the management of public goods. In particular, trust facilitates cooperation in the management of local public goods by trust can reducing transaction costs, encouraging respect for contracts [Akerlof (1970), Holmstrom (1979)], facilitating cooperation (Hardin (2002), Hardin (2006), Fehr & G$^{'}$achter (2002)) and conflict resolution (Ostrom (1990))].

2.5.1. Conclusion

Most work linking cultural values and economic outcomes has focused on Western countries, and finds an important role for trust in explaining economic outcomes. Whether social capital plays a similar role in Africa remains a rather open question. To date, the impact of trust in Africa has mostly been assessed in one country only or across a few communities (Yamada (2013)). Furthermore, the influential work of Easterly & Levine (1997) puts a great deal of weight on ethnic divisions in Africa as an explanation of important economic outcomes such as growth, the quality of infrastructure and schooling. The question of whether social capital might act as a complementary, or even alternative, explanation remains open. In particular, empirical work focused on developing countries, and particularly Africa, is faced with a number of challenges to provide rigorous evidence on the relationship between trust and community ability to produce local public goods : these concern in particular the lack of relevant data.

Deuxième partie

Experimental Approach

EXPERIMENTAL APPROACH

Chapitre 3

Trust As a proxy for production of public Goods

3.1. Introduction

Inefficiencies in the provision of public goods are considered to be one important cause of underdevelopment. States usually provide basic public goods using tax revenue, but are not always able to mobilize the resources necessary to finance them. In these situations, local communities are often called upon to organize the production of the local public goods and services that they need themselves. The problem with the voluntary provision of public goods is, however, the temptation to free-ride, which affects the capacity of groups to carry out collective actions and, thus, the ability of communities to produce local public goods.

Evidence from field research has shown that the capacity to cooperate varies greatly across communities : while some communities are unable to perform joint activities, they are many examples of communities that do engage successfully in collective action to manage local resources (Ostrom (1990) ; Khwaja (2009)). One of the factors Ostrom highlights as explaining this success is the importance of communities' shared norms and rules such as trust and altruism in improving cooperative behavior. These findings have inspired a new interest in the role of shared norms in the capacity of heterogeneous groups to manage joint activities despite the associated problem of free-riding.

Amongst these different norms, trust has attracted particular attention in social science. First analyzed in sociology and psychology, economists have paid greater attention to trust since Arrow (1972) affirmed that "much of economic backwardness in the world can be explain by a lack of mutual confidence". In particular, it is considered that trust can reduce transaction costs, encourage respect for contracts (Akerlof (1970), Holmstrom (1979)) and facilitates cooperation (Hardin (2002), Hardin (2006), Fehr & G$\acute{}$achter (2002)) and conflict

resolution (Ostrom, 1990).

However, trust is anything but a simple concept, both in terms of definition and, thus, how it can be measured. There is no unified and widely-accepted definition of trust in the empirical works : varying and sometimes conflicting measurement methods are applied (Narayan & Pritchett (1999), Karlan (2002), Etang *et al.* (2011), Knack & Keefer (1997), La Porta *et al.* (1997), Knack & Zak (2003), etc...).

The trust measurement methods are of two kinds : survey and experimental. Survey measures include asking individuals directly about their trust attitudes towards others such as "*most people*", "*neighbors*" or "*strangers*". [1]. The alternative is to carry out experiments and the most widely-used experimental measure of trust is the trust game, initially developed by Berg *et al.* (1995) (the standard method of trust game is described in the section 3.2.2). While the most used survey question aimed measuring trust is criticized [2], the validity of laboratory experiment measuring social norms and social preference are questioned as well .

The purpose in this paper is, thus, to investigate the extent to which different measures of trust are connected to a real-world activities namely community's ability to produce local public goods. If this ability depends critically on members' willingness to act collectively, different measures of trust can be tested. The goal of this paper is not to explain the fundamental causes of trust. It is instead interested in clarifying what trust measurement method is better in explaining how heterogeneous individuals manage to engage in joint

1. The most widely-used trust survey question is that in the General Value Survey : "speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people ?". This question appears in the American General Social Survey, the World Values Survey and so on

2. A number of scholars such as Glaeser *et al.* (2000), Nannestad (2008), and Sturgis & Smith (2010) have argued that trust questions are too abstract and do not yield good measures.

activities despite the associated problem of free-riding.

The trust measurement is addressed by comparing a version of trust game in which subjects are matched with a random anonym member of the community (the *Community Condition*" of Trust Game (CCT,)) to a number of survey trust questions. The analysis is carried out in three parts.

First, the manner by which individuals understand the GVS, the questions and whether the GVS trust question is related to the experimental behavior is investigated. Results indicate that the GVS trust question is understood to mean trust in strangers, while the experimental design captures a particular form of trust regarding people who live in the respondent's own local area, the CCT. Further, results show, unlike Fehr *et al.* (2003), that the CCT as a measure of trust is not correlated with GVS trust question or any other survey-based trust measures.

In the second step, the analysis concern to test whether trust measurement can be used in the social interactions contexts. Measuring trust in social contexts is difficult especially via survey questions which have been shown to produce responses that vary according the interpretation given to the question (Naef & Schupp (2009), Sturgis & Smith (2010)). The problem is to know whether data obtained are comparable when it is difficult to know if individuals define trust in the same way, and more importantly, have the same thing in mind when they refer to groups such as "most people", "neighbors" or "strangers". This may reflect that individuals identify themselves with a specific group to which they belong as a function of their social status (such as by gender, race, or profession) or regard others according to their social position. Results provide evidence that responses in survey trust questions are subject to differential reporting bias. Our results thus suggest that unlike,

survey questions, experimental results can be more easily compared across communities, despite any differences in their social structure.

Third, the different trust measures are correlated with the individual's voluntary decision to participate in the provision of the local public goods such as *tontine* (that provide collective insurance systems for many African villages communities (see (Anderson *et al.*, 2010)), *credit association* (which is an alternative to the formal financial system, which latter is inaccessible to the poor) and *animation* (which covers social-cohesion activities, such as the organization of sporting activities, cleaning the village, and environmental-protection activities). Results show that trust, as measured by survey questions, has poor predictive power, while the results from a simple trust game are much better predictors of public-goods production. More particulary, the results show that a one unit increases in the amount sent in trust game increases the odds of participation in *Tontine* by 2,3%, the odds of participating in *Credit Association* by 2.6% and the odds of participation in *Animation* activities by 1.7%. The standard measure of trust, the *GVS* trust question, for example, individuals likelihood to participate in *Tontine* and *Credit Association* is better suited than other measures in predicting involvement in activities of *animation*. In contrast, measurements from direct questions on trust in others such as, questions regarding trust in neighbors and trust in strangers, has no predictive ability of participation in collective activities.

This paper contributes to the literature in several ways. First, the results of this paper complements the expanding literature on the external validity of lab experiments specially those using trust game to predict real-life decision [Karlan (2002), Levitt & List (2007), Cardenas & Carpenter (2008), Bouma *et al.* (2008), Benz & Meier (2008), Carpenter & Seki

(2010), Etang *et al.* (2011), Voors *et al.* (2011), Thoni *et al.* (2012) and Voors *et al.* (2012)]. The evidence with respect to the external validity of experiments is mixed. While some studies find any correlations between behavior in the game and real life (Voors *et al.* (2011) and Voors *et al.* (2012)) others document a positive and significant correlation between decision in lab experiment and real-world activities. This paper adds in this literature by providing evidence that trust behavior in experiment is a good predictor of real-world decision. Furthermore, an informal procedure developed by Altonji *et al.* (2005) is used to insure that the correlation in not driven by unobservable heterogeneities. The results show that the correlation found in this paper can be interpreted as strong.

Second the results of this paper intervenes in the literature on the comparison of survey and experimental measure of trust. The trust game has been used by Glaeser *et al.* (2000), Fehr *et al.* (2003) and Danielson & Holm (2005) to test the validity of attitudinal trust questions with mixed results. Using a sample of Harvard students, Glaeser *et al.* (2000) compare attitudinal questions to behavior in the Trust game. They find that the trust measured by the attitudinal questions is not correlated with the level of trust in the trust game. Unlike Glaeser *et al.* (2000), Fehr *et al.* (2003) use a sample of German households, and find that attitudinal trust is correlated with behavior in the trust game. Danielson & Holm (2005) observe similar differences in the link of the two trust measurement methods between Sweden and Tanzania studies.

The remainder of the paper is organized as follows. The details of our methodology including the survey procedure and experimental design are described in Section 2. Section 3 describes the data from the survey and experiment, and Section 4 tests which trust measure best explains participation in the provision of local public goods. Last, Section 5

concludes.

3.2. Context

The data here come from survey and experiment conducted in May 2010 in 3 villages in Mbour department in West Senegal. Since the early 1980s these villages, like most Senegalese villages, have faced drought and falling prices for groundnuts, their main crop. After several failed policies aimed at reviving the agricultural sector, the government decided, with the support of international institutions, to adopt a strategy of giving greater responsibility to the local population. This led to a reduced government presence and the promotion of local organizations that were supposed to be more flexible and responsive. These local organizations contributed greatly to poverty alleviation by enabling people to access a certain number of basic public goods and services at lower cost. Several types of local public goods and services such as training, banking, the management of irrigation, input supply, sanitation services and agricultural advice and training are provided by the local population.

Three types of activities used to finance or product local public goods and services are considered : monitoring savings (*tontine*), monitoring credit (*credit association*) and social-cohesion activities (*animation*).

- *Tontine* refers to an association of individuals who meet at more or less regular intervals in order to pool their savings. Participants make a fixed contribution at each meeting to a common fund. The total sum contributed at each meeting is allocated to one of the participants, generally by lot. These winners then pay back the loan over a period of time. Over the cycle each participant is guaranteed to win this loan exactly once permits to

implement collective insurance systems for the community. Because this functions via the mechanisms of mutual guarantee and monitoring, *tontine* is not, however, at risk from abusive and opportunistic behavior. (see Anderson & Baland (2002) and Anderson *et al.* (2010) for ROSCAS in Kenya)

- The *Credit Association* is an alternative to the formal financial system, which latter is inaccessible to the poor. This funds local projects ranging from small businesses to village agricultural projects. The fund is managed by a committee which is composed of individuals who are considered to be trustworthy. As with the *tontine*, *Credit Association* funds are reserved for members only. However, participation is open to the entire village.

- *Animation* covers social-cohesion activities, such as the organization of sporting activities, cleaning the village, environmental-protection activities and collective fields activity. The collective fields activities refers to private land that members of the group cultivate collectively, in turn for the families of each group member.

3.2.1. The survey

The villages in our survey are involved in public-good provision activities that are typical of African villages. While the village is chosen for this reason, the households surveyed in the village are randomly selected to provide a representative sample (In each the list of all households is given by the chief and 15 percent of the households of each village has chosen by lot to participate). In each selected household, the household head is asked to either participate or send a representative. The survey and the experiment covered a sample of 164 third individuals in the communities (66 on the first, 58 ion the second

village and 40 on the corresponding on the 20 percent of the households each village)

TABLE 3.1 – The characteristics of sample participants

	Mean	Std Dev	Min	Max
Number of observations	164			
Household expenditure in dollar (per day)	2.5	16.46	0.55	7.78
Age	36.17	14.40	18	75
household Size	10.51	5.47	2	21
Education (years)	2.78	3.76	0	14
Female	44.1%		0	1
Married	81.71%		0	1
Christian	20.73%		0	1

Note : Household expenditure per day is in dollar (1 dollar = 450 CFA).
Source : Field survey data

The survey was conducted via face-to-face interviews with participants. The questionnaire has two parts. The first part covers household characteristics and the relationship with other people living in the neighborhood. Table 3.1 provides a brief description of these characteristics.

The second part of the questionnaire concerns the trust questions. Respondents are asked to state their trust levels with respect to particular types of people : neighbors, individuals participating in experiments, and strangers. The questions concerning trust in strangers had split up into four types : strangers met for the first time, foreigners who regularly trade with villagers, strangers from the same ethnic group as the respondent, and strangers from a different ethnic group. Respondents answer the trust questions on a one to four scale (1 = Not at all ; 2 = Somewhat ; 3 = Sometimes ; and 4 = A lot). The trust data is summarized in Table 4.1

The question which is the most frequently used to measure trust : "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing

with people ?" is added. Respondents reply either "Most people can be trusted" or "Can't be too careful when dealing with people". Another group of questions concerns trust in the village authorities. Table 4.1 summarizes the various measures of trust as described above

TABLE 3.2 – Description of trust variables

Variables	Description	Mean	Std. Dev.
Villagehea	Trust in traditional leaders	3.39	1.00
Neighbors	Trust in neighbors	3.38	0.90
Group members	Trust in group members	3.23	1.07
Co-ethnics	Trust in people of your ethnic group	3.06	0.95
Traders	Trust in foreign traders	2.75	0.98
Otherethnic	Trust in other ethnics group	2.53	1.09
Strangers	Trust in strangers	2.27	1.01

Notes : Replies are on a one to four scale ((i) not at all, (ii) just a little, (iii) somewhat, or (iv) a lot.)
Source : Field survey data

3.2.2. The Trust Game

Our behavioral measure of trust is a version of the investment game in Berg *et al.* (1995), where two players, a sender and a receiver, are both allocated an endowment of 1000 CFA (2.23 dollars). The sender then has to decide how much of the endowment (1000 CFA) to send to an anonymous receiver. The sender is informed that the amount sent is tripled by the experimenter on the way to the receiver. The receiver then decides how much of this tripled amount to keep (Y) and how much to return to the sender. The amount sent by the first mover (the sender) is interpreted as a measure of trust and the second mover's transfer a measure of trustworthiness.

The experiment is implemented by first explaining it clearly (repeated as often as necessary) to the subjects. After providing some examples and asking questions about the game to be sure that it was well understood, all participants receive their endowment of

one thousand CFA (two dollars).[3] Participants are not allowed to communicate with each other during the game.

All participants belong to the same village and know each other (at least each participant knows the others by name). A key element of our design is that each participant knows that he is randomly matched with a member of his own community but he has no idea of his opponent's identity. This procedure is similar to that in Buchan *et al.* (2000), which is called the *society condition* (of the Trust Game). The Senders, when they play with their own community members as responders, are faced to a dilemma that is to send any amount or not. With this design of the trust game that we call *Community Condition of Trust Game* (CCT), we expect to capture the level of trust (the amount sent by the first player called the CCT trust) that explains why subjects participate (or not participate) in provision of public goods.

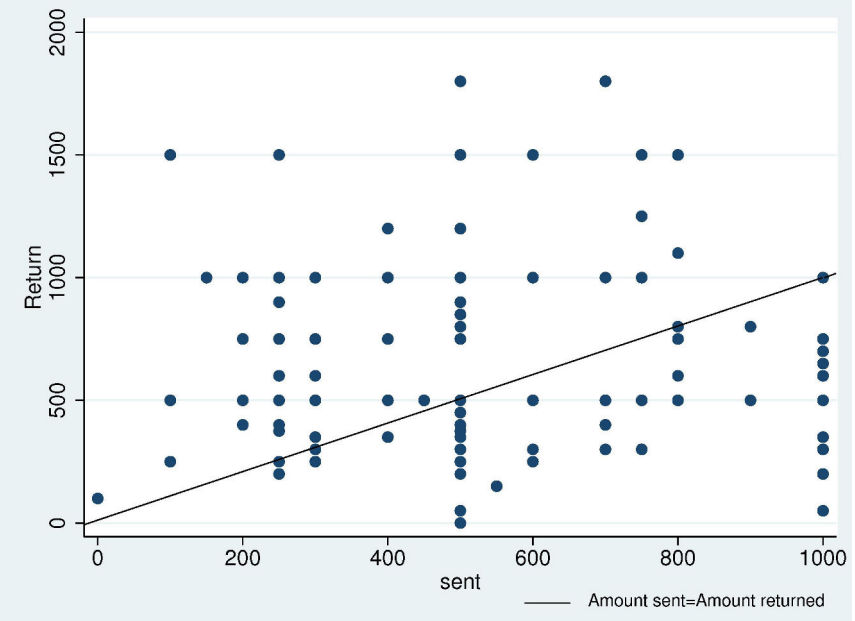
The subjects are given an identification code before privately making their decisions that they put into an envelope. Following the senders' decisions the experimenter multiplies the amount and the envelopes are randomly assigned to receivers. The receivers then decide how much to send back, and the game ends.

Figure 3.1 presents the distributions of the amounts shared by the players. While the sub-game perfect prediction is to send zero, subjects send, on average more than the half of their endowment and only one percent of receivers sent back zero. On average, first movers send 53 percent of their endowment, which is consistent with the results in **?** for South Africa and substantially lower than amount shared in Etang *et al.* (2010)(for a comparison with the results of experiments conducted in developing countries see Cardenas & Carpen-

3. This is more than the local daily wage

ter (2008). This, however, is a larger figure than that observed in laboratory experiments in Western countries (see Buchan *et al.* (2000))

FIGURE 3.1 – The amount shared in the Trust Game



Note : this figure refers to all 164 participants. There are only around ninety points in the figure as a number of the former refer to multiple individuals.

3.3. The analysis of the survey and experimental data

In this section, analysis of the relationship between the trust measures is made in first step and an investigation of whether these measures are related to social interactions is performed in second hand.

3.3.1. The relationship between the different trust measures

The aim of this section is to examine how individuals in the sample interpreted the different trust questions and see how these are related to the GVS trust question and trust behavior in the Trust Game. To do so, A classification of the particular trust questions according respondents' answers is made. The particular trust questions concern trust in people ranging from the closer neighbors to strangers met for the first time.

Figure 5 shows the mean levels of trust in others, and shows that trust falls with social distance. In other words, individuals report higher levels of trust if the individual or group is closer to him. This result, similar to that obtained in Cardenas (2003) and Etang *et al.* (2011), is used to classify the questions into trust in relatives and trust in strangers. The Spearman rank correlation of the different survey trust measures is looked. The results in Table 5 confirm the two-part classification. Those who exhibit greater levels of trust in group members are also those who trust their neighbors more (Spearman rank correlation = 0.42, $p < .000$), and village authorities ($p < .000$). On the other hand, individuals rank trust in strangers, co-ethnics and other ethnic groups in the same way. However, trust in foreign traders is somewhat ambiguously ranked, being classified by respondents as both trust in strangers ($p < 0.05$), trust in group members ($p < 0.05$) and trust in neighbors ($p < 0.05$).

Now, the relationship between these two trust categories and other measures such as the GVS trust question and the *CCT* will be examined. The table 6 shows the results of a logistic regression of GVS trust on the specific trust questions. One common criticism of the GVS question [(Glaeser *et al.* (2000)] is that it is considered as too abstract. The question is therefore to know how it understood by responders : Is this a trust question

regarding relatives, strangers or simply the whole society ? Here it seems that the GVS trust question is interpreted as trust in strangers. The regression results show that while there is no correlation between trust in neighbors and GVS trust, the latter is positively and significatively correlated with trust in strangers met for the first time ($p < 0.001$). The GVS trust is also correlated with trust in foreign traders, and trust in people from other ethnic groups. Therefore the GVS question is correlated with all of our scales of trust in strangers. This is consistent with the suggestion in Glaeser *et al.* (2000) that questions regarding trust in strangers are more precise than non-specific trust questions such as that in the GVS.

The relationship between the CCT measure and the survey is now examined. An OLS regression of the amount sent by the first player in the Trust Game on each of the replies to the direct question regarding trust shows that the CCT is negatively correlated with trust in strangers. This suggests that, as opposed to the GVS trust question, the amount sent measures specific trust in relatives in our experiment. Regressions show that there is no significant relationship between the CCT and the other survey trust measures, including trust in group members and neighbors. The correlation between the CCT and the response to the GVS trust question is insignificant, consistent with Glaeser *et al.* (2000).

In sum, none of our seven survey trust measures is related to trusting behavior in the Trust Game, the CCT. The question is then to know whether these measures are uncorrelated because they measure different types of trust or simply because they are not all valid trust measures. The following section therefore focuses on the ability of these various measures to provide effective evaluations of trust.

3.3.2. Evaluating the consistency trust measurement methods via social relations

This section question the validity of our survey questions and experiment in measuring trust in our sample. While the quality of trust measured by questions and experiment has been widely discussed in the literature (Berg *et al.* (1995), (Glaeser *et al.* (2000), and Sapienza *et al.* (2007)) it is only rarely presented in a social-interaction context.

3.3.2.1. Addressing survey trust questions via social interactions

Measuring trust in social contexts is difficult especially via survey questions which have been shown to produce different responses according to the interpretation given to the question (Sturgis & Smith (2010)). As for survey questions, it is difficult to know if individuals define trust in the same way, and more importantly, have the same thing in mind when they refer to groups such as "most people", "neighbors" or "strangers". This may reflect that individuals identify themselves with a specific group to which they belong as a function of their social status (such as by gender, race, or profession) or regard others according to their social position. Furthermore, Gächter *et al.* (2004) find that the socio-economic background affects trust attitudes. Thus, a conjecture that responses to trust questions are correlated with social position is made.

To test this idea, the variance in reported trust across social classes are compared. This reveals that social groups are statistically significantly correlated with survey trust. For example, there are significant differences across income classes with respect to trust in group members (Kruskal Wallis test and coefficient = 9.793, p-value < 0.007), neighbors (Kruskal Wallis test and Coefficient = 3.330, p-value < 0.100) and traders (Kruskal Wallis

test and coefficient = 6.095, p-value < 0.05).

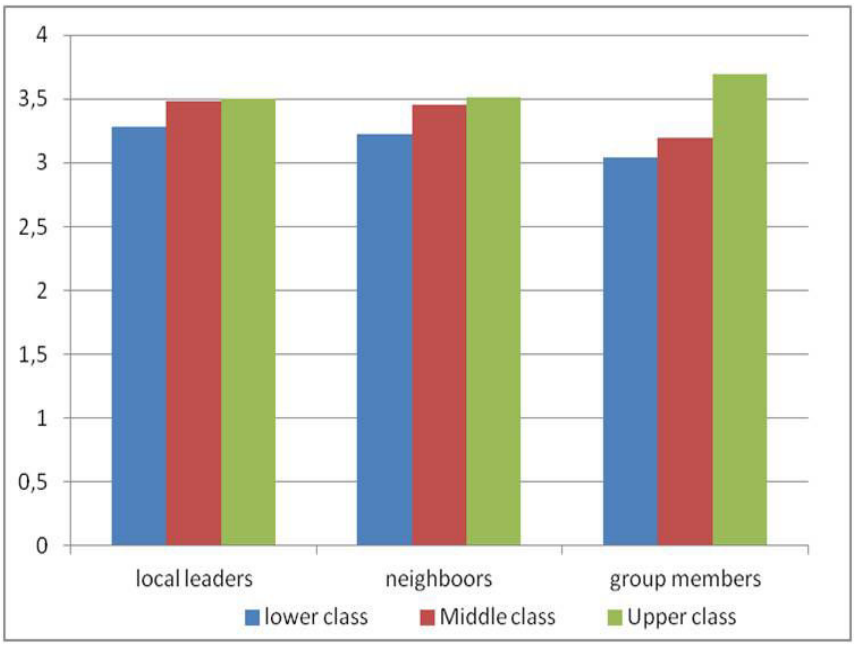
The response to the GVS trust question is the only one affected by the size of household, which may show that this question captures, in addition to trust, the degree of open-mindedness of responders. Tables 12 and 13 show the results from Wilcoxon-Mann-Whitney tests for different social classes. There are significant differences between individuals according to the strength of their ties with village traditional leaders with respect to trust in group members and village authorities (respectively p=0.07 and p=0.009). These results suggest that the responses to trust questions can be considered as a proxy for community social structure. This has important implications in terms of inter-community and international comparisons. As stressed by Naef & Schupp (2009) and Sturgis & Smith (2010), comparing the level of trust across communities or countries may be problematic, and can be viewed instead as a comparison of the social structure of these communities or countries.

Figures 3.2 and 3.3 display the differences in mean responses to the trust questions by social class. Trust responses are higher for those who are more integrated into the community : those with higher social positions or kinship with local leaders trust more. Social position in the community thus needs to be taken into account for the measurement of trust. This requires the researcher to spend time in such communities in order to understand the complexity of the norms and rules within each community.

3.3.3. The behavior in the Trust Game

The design of the *CCT* overcomes the problems encountered with survey questions. While subjects know that they are randomly matched with another group member, they

FIGURE 3.2 – Mean responses by income classes.

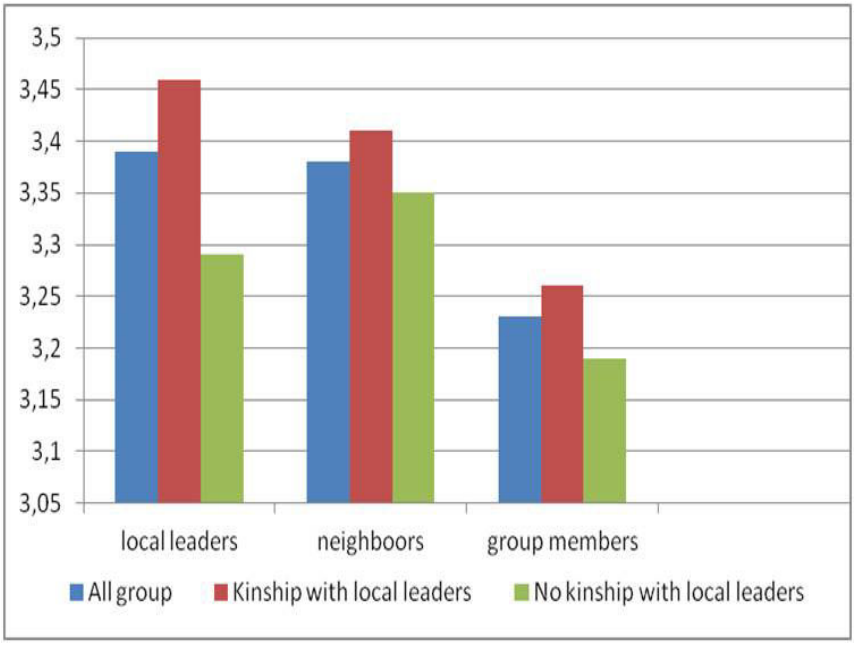


Source : Field survey data

do not know their opponent's identity. The aim here was to capture the subject's trust in a random person from the community independently of the social position. The test results of *CCT* obtained by the amount sent show that, as expected, the experiment captures a broader level of trust independent of the social position of subjects and thus the social structure of the community. The tests on the variances were insignificant, with p-values from the Wilcoxon-Mann-Whitney tests well over the the five percent level, showing that experimental trust is not affected by social position.

However, the principal problem of the Trust Game as a measure of trust is, as shown by Cox (2004), Karlan (2002) and Schechter (2007) the first player's action may be driven by preferences other than trust, such as risk or altruism. To determine the motivation of the first players in our experiment, subjects are asked to state how much they expected

FIGURE 3.3 – Means of responses by kinship with local leaders. Source : Field survey data



in return when sending money to their opponent. We find a highly positive relationship between the amount sent and the amount expected. This result can be interpreted in the light of Sapienza *et al.* (2007), who suggest that trust has a belief and a social-preference component. Knowing that expectations regarding the amount to be returned by the second player explain 88 percent of the amount sent by the first player, this suggests that first-player behavior reflects, at least for the largest part, a belief-based component of trust. While first-player behavior may be affected by other-regarding preferences such as risk or altruism, these therefore seem to be only secondary.

3.4. Using Trust To Predict Participation In Local Public Good Production

The next step in comparing our various measures of trust is to see whether they are correlated with a real-world problem of the production of local public goods. In particular, analysis will be focused on the public goods and services produced in our village of monitoring savings(*tontine*), monitoring credit (*Credit Association*) and social-cohesion activities (*animation*).

3.4.1. Model specification

On the basis of information collected by interviewing staff members, it is possible to establish which individuals participate in *tontine* and *Credit Association*. Information on participation in *animation* activities are collected directly by interviewing households about their implication in a list of social-cohesion activities, such as the organization of sporting activities, cleaning the village, and environmental-protection activities. Over 57 percent of households in the experiment are members of the *tontine*, 45 percent have already contracted a loan from the *Credit Association*, and 56 percent of households have already carried out *animation* activities.

De Janvry & Sadoulet (2004) identified a number of individual characteristics which determine participation in collective activities in Senegal, such as income, size of households and age. I here concentrate on the role of trust in the provision of public goods. This can be modeled via a discrete-choice equation such as :

$$Prob(Z_{ik}) = F(Trust_i, X_i, Y_j) \tag{3.1}$$

where *Prob(participate)* is the probability that the household i participate in the provision of public goods j, trust is a measure of trust, X is a vector of individual characteristics and Y a vector of community dummies. The binary latent variable Z_{ik} equals 1 if household i participates in the provision of the public good and 0 otherwise, where k = *1, 2, 3* denotes the three local public goods. The reduced formed to be estimated can be represented such as :

$$Tontine = \gamma_{11}\, Trust_i + \gamma_{12} X_i + \gamma_{13} Y_j + \varepsilon_i \tag{3.2}$$

$$Credit = \gamma_{21}\, Trust_i + \gamma_{22} X_i + \gamma_{23} Y_j + \varepsilon_i \tag{3.3}$$

$$Animation = \gamma_{31}\, Trust_i + \gamma_{32} X_i + \gamma_{33} Y_j + \varepsilon_i \tag{3.4}$$

where, $Trust_i$ denotes the level of trust measured in the individual level and X_i denotes a set of individual controls and Y_j are dummies at the village level.

3.4.2. Analysis of results

Tables 7 and 10 the results of logistic estimations of equations 6.1, 5.2 and 3.4 for each trust measurement methods. Before analyzing the results, a test for assessing whether the explanatory variables used in the participation equation are satisfactory in the estimation is made. The test is made via the Hosmer-Lemeshow goodness-of-fit statistic, which is based on the distance between the predicted and observed values. The resulting Chi_2 statistic

is at least 1.5, indicating that they are properly calibrated.

The question is now to know to what extent these trust variables explain the different equations. Table 7 reports results of the *CCT* on participation in different public goods provision activities e.g *Tontine* (equation 6.1), *Credit Association* (equation 5.2) and *Animation* (equation 3.4). A first reading of the table of results reveals that the estimated coefficients of the CCT variable is, as expected, positive and significant. A one unit increase in the amount sent, the odds of participation in *Tontine*, *Credit Association* and *Animation* increase respectively by a factor of 1.023, 1.026 and 1.0172. In other words, an one unit increases in the *CCT* increases the odds of participation in *Tontine* by 2,3% the odds of participating in *Credit Association* by 2.6% and the odds of participation in *Animation* activities by 1.7%.

Unfortunately, the trust in neighbors and strangers have no effect in the participation in public goods activities. As you can noted it in the tables 8, the coefficient of the corresponding variables, *STRANGERS* and *NEIGHBOORS*, are insignificant.

The results of logistic estimation of effect of GVS appear in tables 10. The estimated coefficient is positive and significant for the participation in *Animation* activities but remains insignificant for the other public good activities. The size of effect of GVS in participation in *Animation* is substantial. Considering that most "*most people can be trusted*" increases the log odds of participating in *Animation* by 2.49.

The other variables that effect the decision to participation in public goods provision activities are age for *Animation* activities, the income and the level of trust in village headers for *Animation*. However, CCT remains the most important determinant of participation in the different public goods none of the kind of trust seems plays a such important role. To

see whether this result is consistent a number of test based on comparison of the goodness of fit of the estimation of public-goods equations will be carried out.

3.4.2.1. Comparing different measures of trust

The analysis consist in estimating each public-good equation with the different measures of trust and to compare the goodness of fit. The strategy is based on the comparison of the log-likelihood L of models. Two criteria are used : a parametric and non-parametric one.

The parametric criterion consists in comparing the Akaike Information Criterion (AIC) obtained after the logistic regression of the different models. The AIC selects models according to how close the fitted values are to a certain expected value, by minimizing the value of $-2L + 2\rho$, where ρ is the number of parameters in the estimated model.

The non-parametric test is performed by the area under the receiver operating characteristic (ROC) curve (AUC). The AUC tests the models' ability to discriminate between those who participate in public-good provision and those who do not. The ROC curves are constructed by calculating the sensitivity and specificity for consecutive cut-off points according to the predicted probabilities. The higher is the area under the curve, the better is the model. The general approach to compare the AUC of two models can be obtained by the standard error of the difference between their two AUCs.

In sum, there are four candidate models for each of the three public-good equations. First the models for each equation are compared using the AIC criterion. The ensuing test results are shown in table . The AIC statistics for *Tontine* (equation 6.1) suggest that the

model CCT, using the behavioral measure of trust, the *CCT* is the best for the estimation of participation in *Tontine*. While the AIC of the model with this *CCT* as measure of trust is 1216.39, the models with the survey trust measures produce AIC figures of 225.14 (NEIGHBORS), 223.17 (STRANGERS) and 223.25 (GVS).

The results for *Credit* (equation 5.2) lead to the same conclusions. The CCT model are explains *Credit* the best, according to the AIC criterion. The results from the estimation of *Animation* (equation 3.4) are different, as here it is the GVS model which performs the best : the AIC value for the GVS model is lower than those from the other models.

TABLE 3.3 – Table of AIC values with rank in parenthesis

	CCT	**NEIGHBORS**	***STRANGERS***	**GVS Trust**
Tontine	216.69 (1)	225.14 (4)	223.17 (2)	223.25 (3)
Credit	222.88 (1)	232.63 (2)	233.78 (4)	233.76 (3)
Animation	210.37 (2)	217.15 (3)	216.08 (4)	208.69 (1)

These AIC results then suggest that *CCT* provides the best fit of *Tontine* and *Credit*, while the GVS question works best for *Animation*. These results are confirmed by the use of the AUC as the selection criterion. The AUC reported in table 3.4 confirms that the *CCT* works best for equations *Tontine* and *Credit*. The results provide AUC values of 0.6881 and 0.6765 for the CCT model in *Tontine* and *Credit* respectively, while the models using trust in neighbors and strangers produce respectively values of only 0.6306 and 0.6431 for *Tontine* and produce 0.5908 and 0.6035 for *Credit*. For *Animation*, the highest AUC value was obtained for the model using the GVS question (AUC = 0.7348). According to both the AIC and AUC criteria, equations *Tontine* and *Credit* are best fit by the *CCT*, whereas *Animation* is best explained by the GVS trust question.

TABLE 3.4 – Difference in AUC between the *CCT* measure of trust and survey measures one. (Ho : area(CCT) = area(NEIGHBORS))

	Obs	AUC	Diff	p-value
Tontine				
CCT-NEIGHBORS	164	0.6881 - 0.6306	+ 0.0575	0.100
CCT-STRANGERS	164	0.6881 - 0.6431	+ 0.0450	0.221
CCT-GVS trust	164	0.6881 - 0.6401	+ 0.0480	0.068
Credit				
CCT-NEIGHBORS	164	0.6765 - 0.5908	+ 0.0857	0.043
CCT-STRANGERS	164	0.6765 - 0.6035	+ 0.0730	0.105
CCT-GVS trust	164	0.6765 - 0.5864	+ 0.0901	0.036
Animation				
CCT-NEIGHBORS	164	0.7312 -0.7116	+0.0196	0.329
CCT-STRANGERS	164	0.7312 -0.7118	+0.0194	0.361
CCT-GVS trust	164	0.7312 - 0.7348	- 0.0036	0.900

These results are in line with those from the comparison of models via the AIC and AUC criteria. In the case of the estimation of participation in *Animation*, the AIC and AUC criteria suggest that the GVS trust question produces the best results, but the likelihood-ratio tests reveal that both GVS trust and the *CCT* make a significant contribution to the estimation of this equation.

Over all, the results show that CCT is better to predict participation in provision of public good activities. However, the correlations found in this paper may be spurious e.g driven by omitted variables at the household level. The final step of the analysis of the results consists in addressing wether the correlation found between CCT and participation in public goods provisions are driven by unobservables heterogeneities.

3.4.2.2. Addressing potential omitted bias

The objective is to assess in what extent the relationships between the amount sent in experiment and participation in tontine and credit association are likely to be driven by unobservable heterogeneities. For this purpose the strategy adopted by this paper follows Altonji *et al.* (2005) and tries to formalize how should be the size of selection on unobservable relatively to selection on observable in order to attribute the entire effect of CCT to a selection effect.

In order to operationalize this method, an index of participation is created. Two set of regressions are done with the participation index. The first is an OLS estimation of the effect of CCT in the participation index controlling a used of variables as in table 7 and the corresponding coefficient is denoted γ^C. The second regression is an OLS estimation of the effect of CCT on participation without controls. The resulted coefficient is denoted γ^W. The ratio Altonji *et al.* (2005) is obtained by : $\rho = \gamma^C/(\gamma^W - \gamma^C)$. The intuition behind this ratio is the following. The larger is γ^C, the stronger is the effect that is left after controlling for observables and the more would unobservables have to explain in order to reduce the coefficient to zero. The larger is the difference between γ^W and γ^C, the larger is the estimated coefficient influenced by observables and the stronger would the selection of unobservables have to be relatively to the selection of observables to explain away the entire effect (Nunn & Wantchekon (2011) and Satyanath *et al.* (2013)).

Results are reported in the table 11. The beta coefficient of the regression with controls, γ^C, is represented in the first column and the regression without controls, γ^W is presented in the second column of the table. while the ratio obtained, ρ, which can be read in the last column is equal to 12,310 meaning that the covariance between the unobserved characte-

ristics and the participation must exceed the covariance between our selection of controls 12 times to explain away the entire effect. [4] This make us confident that the effect found in the OLS estimations are not only driven by unobserved heterogeneities.

3.4.2.3. Summary and interpretation of results

The aim of this paper is to find the trust measure that better explains the participation to three different public good : *tontine*, *credit association* and social cohesion activities or *animation*. So, an experimental measure of trust, is designed to be compared to a number of survey trust questions. First, the relationships between these different trust measures are examined. The results show, as in Glaeser *et al.* (2000), that trust measured by the CCT is not correlated with replies to the *GVS* trust question. Further results let appear that GVS trust is correlated with trust in strangers in our sample, while the Trust Game, played by people in the same community, captures the level of trust within the community, the CCT. However, this does not explain why the trust in neighbors and experimental trust, the CCT, are not correlated, particularly why it is not correlated with trust in neighbors.

This led us to address the reliability of trust measurements via social relations. Responses to trust questions are correlated with respondents' social positions and, furthermore, are proxies for the level of the individual's integration into the community. Trust as measured this way is higher when the individual is well-integrated socially. By way of contrast, the CCT seems to capture the "mean" level of individual trust in community members, regardless of social structure. Results show that the amount CCT by the first player in the Trust Game, the CCT, is correlated at the 87 percent level with the expectations of the

4. A rule of thumbs announced by Nunn & Wantchekon (2011) requires that at least a ratio equal to 3 for proving that the OLS estimate found is not fully driven by selection on unobservables.

amount that will be CCT back by the anonymous second player, randomly chosen from members of the community.

This general profile of our different trust measures permit to address the main question of this paper : which of these trust measurements explain better participation in the three collective actions in our communities of *tontine*, the *credit association* and *animation*. Trust measured by the CCT has good explanatory power while survey questions only poorly explain participation in these public-good activities. The weak explanatory power of survey trust questions may reflect that these are determined by the social structure of respondents' communities, as shown in Section 3.3.2.1, and therefore capture heterogeneity in the nature of social relations of respondents which have negative effects on the provision of public goods (Banerjee *et al.* (2005), Alesina & La Ferrara (2000) etc). The GVS trust question has no significant predictive power for participation in the *Tontine* and the *Credit Association* but works better than the other measures in predicting involvement in *animation* activities. This can be explained by the fact that the GVS question seeming, at some level, to capture the open-mindedness of the respondents in addition to capturing trust in strangers. This may explain why it captures, unlike other survey questions, individual participation in Animation activities, the benefits of which benefits go to the entire villages, in contrast of tontine and credit activities, the benefits of which are for members only. Apart from the immediate financial implications, the CCT, in addition to measuring the respondent's trust in a randomly-chosen person from the community (Section3.3.2.1), mirrors the real-life provision of public goods. These results differ from those obtained in Voors *et al.* (2011) and Voors *et al.* (2012), in which the behavior in experiment is not correlated with real-world activities. The results differ also from those obtained in Fehr

et al. (2003) in which survey and experimental measure of trust are correlated.

3.5. Conclusion

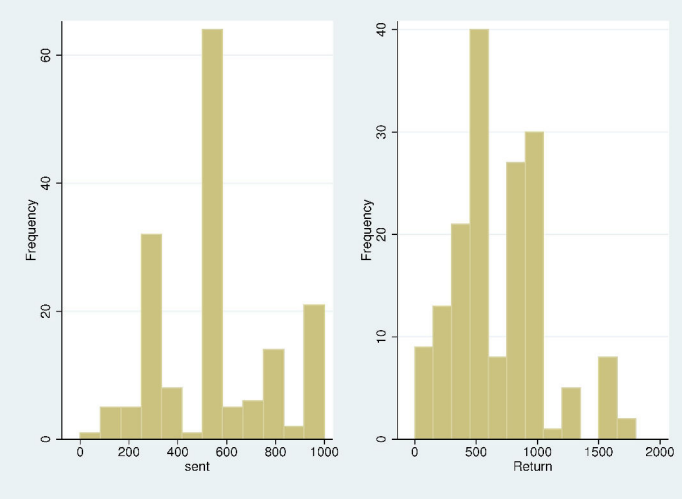
This paper has discussed the strengths and weaknesses of different forms of trust measures. Our main aim was to see which of these measures can explain why some individuals carry out joint activities. To do so, a version of the Trust Game, the *CCT* is implanted in some small villages in Western Senegal, the results of which survey trust questions are compared : the GVS trust question and specific questions regarding trust in neighbors and trust in strangers. We find that trust, as measured by survey questions, has poor predictive power, while the results from a simple *CCT* are much better predictors of public-goods production.

These results have important policy implications, and in particular for the promotion of community organizations based on social capital. Survey trust questions yield greater trust scores for individuals in higher social positions or with kinship with local leaders. If this correlation with respondents' social status is not taken into account, the results may be biased in favor of groups with higher social status and thus exclude certain individuals from full participation in the social and economic life of a community. This may in particular increase inequality in the access to opportunities. Thus survey trust questions fail to capture trust in the face of diversity, and furthermore fail to explain sufficiently trust levels that allow individuals with different social statuses to carry out collective activities despite their heterogeneity. To determine this latter level of trust, it is necessary to understand the social structure of the community group and identify respondents' social positions. This, therefore requires that the researcher spend time in such communities in order to understand the complexity of community norms and rules. However, given the diversity

and complexity of these latter, this will be difficult, especially when diversity is not easily observable. This paper has suggested a straightforward way of overcoming this problem by showing that an adequately-designed Trust Game constitutes an effective tool to measure the trust behind individual decision to carry out joint activities. This paper has discussed the strengths and weaknesses of different forms of trust measures. Our main aim was to see which of these measures can explain why some individuals carry out joint activities. To do so, a version of the Trust Game, the *CCT* is implanted in some small villages in Western Senegal, the results of which survey trust questions are compared : the GVS trust question and specific questions regarding trust in neighbors and trust in strangers. We find that trust, as measured by survey questions, has poor predictive power, while the results from a simple *CCT* are much better predictors of public-goods production.

Appendices

FIGURE 4 – histograms of amount sent and return in Trust Game.



Source : Field survey data

TABLE 5 – Spearman correlation coefficients of the different survey trust measures

	Group members	Neighbors	Local leaders	Traders	Co-ethnics	Other ethnics	Strangers
Group members	1.00						
Neighbors	0.42***	1.00					
Local lead	0.36**	0.24***	1.00				
Traders	0.16**	0.24***	0.18**	1.00			
Coethnic	0.24***	0.21***	0.25***	0.22***	1.00		
Other ethnic	0.10	0.20**	-0.05	0.38***	0.21***	1.00	
Strangers	0.00	0.09	-0.04	0.27***	0.05	0.29***	1.00

* Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 6 – Estimation results of GVS trust question as a function of trust questions

Variable	1	2	3	4	5	6	7
Gmembers	0.161						
	(0.166)						
Neighbors		0.236					
		(0.192)					
Local.lea			0.030				
			(0.157)				
traders				0.298†			
				(0.175)			
coethnic					0.481*		
					(0.192)		
otherethnic						0.430**	
						(0.160)	
strangers							0.459**
							(0.171)
Intercept	-0.557	-0.781	-0.603	-0.813	-1.136	-1.730	-1.650
	1.789	(1.809)	0.207	(1.816)	(1.886)	(1.877)	(1.860)
N	164	164	164	164	164	164	164
Log-likeli.	-108.413	-108.115	-108.87	-107.408	-105.115	-105.115	-105.097
$\chi^2_{(6)}$	6.92	7.516	6.006	8.929	12.636	13.516	13.553
$Prob > \chi^2$	0.3283	0.2757	0.4225	0.101	0.0815	0.0355	0.0351

Significance levels : $\dagger$: 10% $*$: 5% $**$: 1%

Note :

Estimations with individual controls such age, age squared, income, education and dummies for village

TABLE 7 – Estimation of the effect of CCT on participation on public goods provision activites

	Tontine		***Credit***		***Animation***	
CCT	.0228**	(.0082)	.0266***	(.0077)	.0171**	(.0084)
No_education	.6906	(.4589)	.1751	(.4340)	.5729	(.4291)
Age	.1281*	(.0695)	.0633	(.0673)	-.0192	(.0700)
Age^2	-.0017**	(.0008)	-.0008	(.0008)	.0004	(.0008)
log_income	-.3766	(.3039)	-.0171	(.3154)	-.4589*	(.2772)
female	.0452	(.4668)	-.0626	(.4685)	.0285	(.4352)
Christian	.0352	(.4982)	.2579	(.5085)	-.5834	(.5163)
family size	.0299	(.0420)	.0605	(.0369)	-.0310	(.0374)
T. local council						
2. *Just a little*	.0807	(.6686)	.1451	(.6958)	-.7244	(.6747)
3. *Sometimes*	1.0818	(.7140)	-.0471	(.6429)	.0448	(.6880)
4. *A lot*	.5529	(.5794)	.5170	(.5587)	-.7343	(.5898)
T. village Header						
2. *Just a little*	-.5616	(.8350)	.8976	(.9990)	-1.4362*	(.8275)
3. *Sometimes*	-.0327	(.8268)	.8682	(.9120)	-1.3795*	(.7328)
4. *A lot*	-.2430	(.6332)	1.1560	(.8183)	-1.4297**	(.6279)
Village 2	.2753	(.4679)	-.1291	(.4523)	.5173	(.4585)
Village 3	.0338	(.5571)	-.3460	(.5350)	1.5874**	(.5394)
Constant	-1.4848	(2.0374)	-4.5276**	(2.0399)	3.8897**	(1.9299)
Log-likelihood	-93.278		-102.166		-99.113	
No. of cases	164		164		164	
LR χ^2	7.5		11.10		4.73	
Prob>χ^2	0.006		0.000		0.02	

.

All regressions are logistic. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%. the variables T. local council and T. village Header represent the level of trust in village header and local councilors respectively ; level of trust= "not at all" is the base outcome.

TABLE 8 – Estimation of the effect of trust in neighbors on participation on public goods provision activites

	Tontine		***Credit***		***Animation***	
NEIGHBORS	.1234	(.2044)	.0144	(.2019)	-.1341	(.2288)
No_education	.5985	(.4484)	.1493	(.4319)	.5854	(.4500)
Age	.1713**	(.0670)	.1142*	(.0651)	.0169	(.0698)
Age^2	-.0021**	(.0008)	-.0014*	(.0008)	-.0001	(.0008)
log_income	-.4412	(.2999)	-.0613	(.2948)	-.4422	(.2871)
female	.0912	(.4574)	.0322	(.4500)	.0597	(.4501)
Christian	.0244	(.4976)	.2278	(.5071)	-.5522	(.4939)
family size	.0334	(.0440)	.0594	(.0364)	-.0294	(.0385)
T. local council						
2. *Just a little*	.1701	(.6910)	.2210	(.6970)	-.5785	(.6874)
3. *Sometimes*	.8974	(.7134)	-.1972	(.6377)	-.0541	(.6556)
4. *A lot*	.3776	(.6176)	.3451	(.5836)	-.7157	(.6154)
T. village Header						
2. *Just a little*	-.3864	(.8350)	.7949	(.8809)	-1.4537*	(.8453)
3. *Sometimes*	.1198	(.8302)	.8190	(.8300)	-1.3850*	(.7614)
4. *A lot*	-.3901	(.6191)	.7804	(.6671)	-1.5593**	(.6594)
Village 2	.2074	(.4572)	-.1316	(.4488)	.5424	(.4592)
Village 3	.0787	(.5311)	-.2194	(.5043)	1.6184**	(.5553)
Constant	-.9281	(1.9618)	-3.4702*	(1.9625)	4.4706**	(1.9215)
Log-likelihood	-103.511		-108.788		-95.554	
No. of cases	164		164		164	
LR χ^2	3.05		3.35		1.95	
Prob>χ^2	0.384		0.147		0.582	

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All regressions are logistic. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%. the variables T. local council and T. village Header represent the level of trust in village header and local councilors respectively ; level of trust= "not at all" is the base outcome.

TABLE 9 – Estimation of the effect of trust in strangers on participation on public goods provision activites

	Tontine		***Credit***		***Animation***	
STRANGERS	.2223	(.1908)	.2447	(.1763)	.1530	(.1947)
No_education	.5805	(.4436)	.0803	(.4300)	.4868	(.4386)
Age	.1710**	(.0659)	.1155*	(.0657)	.0153	(.0709)
Age^2	-.0021**	(.0008)	-.0014*	(.0008)	-.0000	(.0009)
log_income	-.4240	(.2915)	-.0712	(.2887)	-.4849*	(.2798)
female	.0539	(.4666)	-.0009	(.4523)	.0601	(.4532)
Christian	.1487	(.5157)	.3699	(.5147)	-.4712	(.5021)
family size	.0313	(.0441)	.0584	(.0372)	-.0292	(.0377)
T. local council						
2. *Just a little*	.2430	(.6875)	.2617	(.6903)	-.5767	(.6839)
3. *Sometimes*	.9150	(.7210)	-.2079	(.6350)	-.0843	(.6451)
4. *A lot*	.4028	(.6042)	.2906	(.5704)	-.8381	(.5893)
T. village Header						
2. *Just a little*	-.4300	(.8163)	.7928	(.8629)	-1.3912	(.8599)
3. *Sometimes*	.0993	(.8250)	.8312	(.8254)	-1.3217*	(.7766)
4. *A lot*	-.3291	(.6139)	.8315	(.6734)	-1.5179**	(.6581)
Village 2	.1821	(.4593)	-.1962	(.4444)	.4590	(.4634)
Village 3	.2119	(.5442)	-.0658	(.5309)	1.7111**	(.5769)
Constant	-1.2143	(1.9360)	-3.9618**	(1.9298)	4.0424**	(1.9481)
Log-likelihood	-102.909		-107.787		-95.403	
No. of cases	164		164		164	
LR χ^2	5.02		4.21		3.02	
Prob>χ^2	0.170		0.239		0.388	

.

All regressions are logistic. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%. the variables T. local council and T. village Header represent the level of trust in village header and local councilors respectively ; level of trust= "not at all" is the base outcome.

TABLE 10 – Estimation of the effect of GVS trust on participation on public goods provision activites

	Tontine		***Credit***		***Animation***	
GVS trust	-.2657	(.3516)	-.1515	(.3567)	.9145**	(.3951)
No_education	.6848	(.4502)	.1723	(.4278)	.4346	(.4329)
Age	.1640**	(.0673)	.1088	(.0667)	.0467	(.0741)
Age^2	-.0021**	(.0008)	-.0013*	(.0008)	-.0004	(.0009)
log_income	-.3792	(.2974)	-.0363	(.2938)	-.6172**	(.2976)
female	.0883	(.4599)	.0304	(.4520)	.0689	(.4525)
Christian	-.0065	(.5009)	.2119	(.5106)	-.4847	(.5136)
family size	.0335	(.0440)	.0594	(.0364)	-.0271	(.0389)
T. local council						
2. *Just a little*	.2295	(.6791)	.2356	(.6913)	-.7302	(.7115)
3. *Sometimes*	.8666	(.7174)	-.2285	(.6480)	.1184	(.6810)
4. *A lot*	.4859	(.6028)	.3634	(.5672)	-.9030	(.5898)
T. village Header						
2. *Just a little*	-.4991	(.8327)	.7468	(.8848)	-1.2333	(.8684)
3. *Sometimes*	.0225	(.8237)	.7782	(.8253)	-1.1559	(.8245)
4. *A lot*	-.4648	(.6223)	.7298	(.6738)	-1.3175**	(.6722)
Village 2	.2414	(.4538)	-.1299	(.4456)	.5336	(.4627)
Village 3	.0587	(.5352)	-.2306	(.5076)	1.7424**	(.5433)
Constant	-.7002	(1.9592)	-3.3899*	(1.9639)	4.1059**	(1.9332)
Log-likelihood	-103.401		-108.695		-92.928	
No. of cases	164		164		164	
LR χ^2	0.54		0.22		6.42	
Prob>χ^2	0.463		0.637		**0.011**	

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All regressions are logistic. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%. the variables T. local council and T. village Header represent the level of trust in village header and local councilors respectively ; level of trust= "not at all" is the base outcome.

TABLE 11 – Altonji et al (2005) ratio

	Model 1.1		Model 1.1	
	b	se	b	se
γ^C	.2679**	(.0003)		
γ^W			.2916***	(.0002)
Controls	Yes		No	
ρ		12.310		
Adj. R^2	.016		.068	
No. of cases	164		ρ	

TABLE 12 – Wilcoxon-Mann-Whitney Test (with significant values in bold)Table

		G. members	**Neighb.**	**Local leaders**	**GVS trust**	**CCT**
Female	Coef	0.007	**2.050**	**1.798**	0.8990	0.2440
	pvalue	0.9940	**0.040**	0.8386	**0.072**	0.8075
Married	Coef	**-1.713**	**-2.496**	**-3.146**	0.7910	0.1120
	pvalue	**0.0868**	**0.0126**	**0.0017**	0.429	0.9111
Christian	Coef	**1.681**	**1.693**	1.008	1.3810	-0.2370
	pvalue	**0.0927**	**0.0905**	0.3137	0.1672	0.8125
No school	Coef	-0.683	-1.5310	**-2.039**	1.0860	0.1710
	pvalue	0.4944	0.1257	**0.0414**	0.2773	0.8643
Respons.	Coef	-0.556	-0.9900	-0.390	-0.738	0.9000
	pvalue	0.5782	0.3221	0.6966	0.460	0.3682
Large family	Coef	**1.333**	0.516	0.592	**1.800**	-1.000
	pvalue	**0.1025**	0.6060	0.5536	**0.0719**	0.3172

FIGURE 5 – Stated trust and social distance

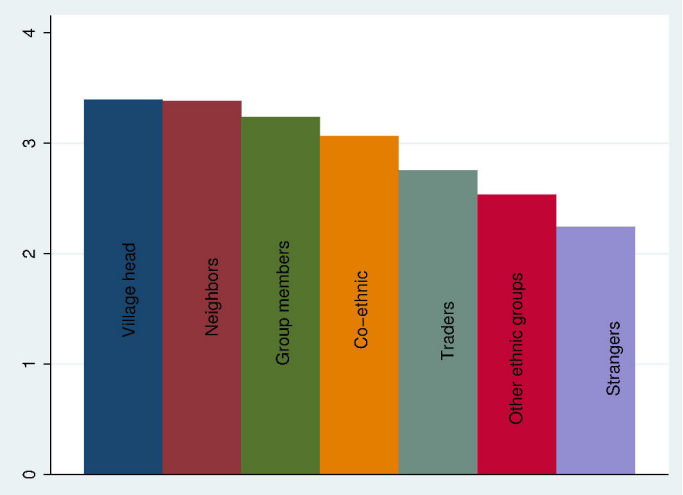


TABLE 13 – Wilcoxon-Mann-Whitney Test (with significant values in bold)

		Traders	**Own ethnic group**	**Other eth, group**	**Strangers**
Female	Coef	1.2130	-0.8090	-0.1160	0.1410
	pvalue	0.2250	0.4185	0.9074	0.8880
Married	Coef	-0.9440	**-1.8540**	0.5160	0.2530
	pvalue	0.3450	**0.0637**	0.6057	0.8001
Christian	Coef	1.1380	**1.8540**	**2.3560**	**2.1540**
	pvalue	0.2550	**0.0637**	**0.0185**	**0.0312**
No school	Coef	-0.5850	1.1770	-1.6050	0.2690
	pvalue	0.5589	0.2391	0.1085	0.7876
Respons.	Coef	-0.6790	-0.9900	-0.1440	-0.2580
	pvalue	0.4972	0.1169	0.8855	0.7961
Large family	Coef	1.333	-0.147	2.110	0.788
	pvalue	0.1825	0.8830	0.0349	0.4306
Consider poor	Coef	0.2330	**3.3920**	1.2650	-0.6970
	pvalue	0.8155	**0.0007**	0.2059	0.4857

Chapitre 4

Using latent trait model to measure trust and predict behavior in experiment

4.1. Introduction

In recent decades, the role of trust in explaining a significant part of economic development has increasingly been recognized. The rapid growth of work on social capital over the past two decades has also gone hand-in-hand with a renewed interest in trust. Social-capital researchers consider trust as a fundamental norm which facilitates collective action and thus economic performance. Putnam (1993), for example, analyzing the development differences between Northern and Southern Italy, concludes that the stronger trusting relationships in the North are behind its economic success. Similar conclusions are reached by Knack & Keefer (1997) and Bornschier (2000). This work has encouraged the emergence of a large literature appealing to trust to explain the pattern of economic development.

In the empirical literature, trust is measured by using surveys and laboratory experiments. Survey measures, the most common, include asking individuals directly about their trust attitudes towards others such as "*most people*", "*neighbors*" or "*strangers*". A widely-used trust survey question is that in the General Value Survey : "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people* ?". This question appears in the American General Social Survey, the World Values Survey and so on. However, survey questions regarding trust are not immune to criticism. A number of researchers have argued that trust questions are too abstract (Glaeser *et al.* (2000), Nannestad (2008), and Sturgis & Smith (2010)) and thus will not produce good measures.

One alternative is to carry out experiments. The most widely-used experiment is the trust game, initially developed by Berg *et al.* (1995). Here, two players, a sender and a

receiver, are both given an monetary endowment (generally 10 dollars). The sender then has to decide whether to send part of his endowment to an anonymous receiver. The sender is informed that the amount sent is tripled by the experimenter on the way to the receiver. The receiver then decides how much of the money to keep and, how much to return to the sender. The amount sent by the first mover (the sender) is interpreted as a manifestation of trust and the second mover's transfer a manifestation of trustworthiness. The trust game was used by Glaeser *et al.* (2000), Fehr *et al.* (2003) and Danielson & Holm (2005) to test the validity of attitudinal trust questions, with mixed results. Using a sample of Harvard students, Glaeser *et al.* (2000) compare attitudinal questions to behavior in the Trust game. They find that the trust measured by the attitudinal questions is not correlated with the level of trust in the trust game. Unlike Glaeser *et al.* (2000), Fehr *et al.* (2003) use a sample of German households, and find that attitudinal trust is actually correlated with behavior in the trust game. Danielson & Holm (2005) observe the same mixed results with respect to two trust-measurement methods in separate analyses in Sweden and Tanzania. This question has been also addressed in a number of other pieces of work in the literature, and to date it is not clear to what extent the responses to the survey questions are good indicators of trust behavior.

The difficulties in establishing a correlation between survey-based and experimental measures of trust may be due to a reporting bias, whereby respondents may interpret questions differently, especially across culture and language. It is difficult for example to know whether respondents define trust in the same way and, more importantly, have the same thing in mind when they refer to groups such as "most people", "neighbors" or "strangers". As a result, survey trust-measures will not be independent of the sample used, so

that the measurements are not invariant (invariance means that people will provide the same expected response to trust questions, given their level of latent trust, even though they belong into different groups or are in different socio-economic conditions). This problem is commonplace in the cross-cultural comparison literature. One way to overcome these problems is to appeal latent-trait analysis.

The goal of this paper is thus, unlike previous literature, to use latent-trait analysis to address trust-measurement problems. In particular, using original data combining survey and experimental trust measures from four villages in Senegal, this paper proposes a class of latent-trait models introduced by Muraki (2009), the Generalized Partial Credit Model (GPCM), to measure trust. In theory, the GPCM allows us to overcome the dependence of trust measurement on the sample. However, two key assumptions are required for the use of GPCM : the hypothesis of *unidimensionality* and *local independence. Unidimensionality* means that a single latent trait determines individual performance in the test, while *local independence* implies that the latent trait of an individual on a test has no effect with respect to performance on other issues. In theory, if these two assumptions hold, the GPCM is free of a number of biases and provides invariant measurements, which makes the objective evaluation of individuals' latent traits possible.

We use a survey dataset from four Senegalese villages where respondents were asked a series of questions concerning their trust attitudes regarding a range of individuals and groups : these are used to construct a latent-trust score. The results show that the latent-trait trust score obtained has a positive and significant relationship with trusting behavior in experiments. Individuals in the fourth quartile of the distribution are more trusting in experiment compared to those in the first quartile, with the difference being statistically significant.

Unfortunately, we do not find such strong results in the link between trust measured as a personality trait and responses to the WVS trust question. In particular, only individuals in the third quartile have higher stated trust levels.

The remainder of the paper is organized as follows. In Section 2, presents the data and the descriptive statistics. Section 3 discuses the methodology adopted in this paper to measure trust as a latent trait. The results of this paper are presented in the Section 5 and Section 6 concludes

4.2. Data and Descriptive statistics

The data in this paper is based on survey and experimental data from four villages from Central and Western Senegal. Subjects were randomly selected from a list of all households in the villages, and were asked a number of questions about their socio-demographics situations after participating in the experiment. Across all four villages, 268 subjects (37 women) accepted to participate in the experiments. Four sessions were organized, with one session per village. Participants were aged between 18 and 75, with an average age of 35.85.

Individuals were asked to state their level of trust in various people ranging from their relatives to strangers that they meet for the first time. The trust questions regarding people they know refer to relatives, other neighbors and the village chiefs (who represent traditional authority at the village level). The trust questions are answered on a one to four scale, where 1 corresponds to “Not at all”, 2 to “Somewhat”, 3 to “Sometimes”, and 4 to “A lot”. The descriptive statistics appear in Table 4.1.

TABLE 4.1 – Description of trust variables

Variables	Description	Mean	Std. Dev.
Trust in close family	268	3.75	(0.61)
Trust in neighbours	268	3.17	(0.99)
Trust in village head	268	3.32	(0.98)
Trust in foreign traders	268	2.75	(0.96)
Trust in same national ethnic groups	268	3.04	(0.92)
Trust in other national ethnic groups	268	2.50	(1.04)
Trust in strangers met for the first time	268	2.28	(1.05)
Trust in the public education system	268	2.78	(1.15)
Trust in the justice system	268	2.52	(1.16)
Trust in local councils	268	2.36	(1.62)

Notes : Replies are on a one to four scale (1=Not at all ; 2=Somewhat ; 3=Sometimes ; 4=A lot)
Source : Field survey data

4.3. Measuring the latent personality trait of trust : the methodological approach

The advantage of using latent-trait theory is that the resulting measure is assumed to be free from a number of biases. The underlying principle is to locate individuals and questions on the same continuum which simultaneously describes a latent trait of the individual and the difficulty of answering the question. There are two assumptions behind latent-trait models : *unidimensionality* and *local independence*. *Unidimensionality* means that a single latent trait determines the performance of the test and *local independence* that an individual's latent trait on one test item has no effect on their performance on other test items. In this paper we use both latent-trait models and economic experiments to measure trust. We first construct the latent trait and test the assumptions implicit in this measurement model ; we then consider the relationship between the latent trait and the experimental results.

4.3.1. Construction of the latent trust trait

In order to measure trust as a latent trait, we use the Generalized Partial Credit Model (GPCM). This choice is based on the polytomous nature of the question used to measure trust. The GPCM is based on the idea that the probability of a positive response in a test is a mathematical function of the respondent's trait and the difficulty (or location) of the test : these two factors are usually distinguished by two sets of parameters. The model is based on Muraki (2009)'s (GPCM), a generalization of of Partial Credit Model (PCM) first formulated by Masters in 1982.

The PCM specifies the probability of choosing the jth category (given two available choices j and $j-1$; j=0, 1, ...3_i) over the $j-1th$ category of a polytomous item i as being given by the response model :

$$C_{ij} = P_{ij|j-1,j}(\theta_n) = \frac{P_{ij}(\theta_n)}{P_{ij}(\theta_n) + P_{ij-1}(\theta_n)} = \frac{exp[\upsilon_{ij}(\theta_n)]}{1 + exp[\upsilon_{ij}(\theta_n)]}$$

where $\upsilon_{ij}(\theta_n) = \theta_n - (\beta_{ij} + \tau_j)$

The parameter θ_n represents the magnitude of the latent trait (ranging from $-\infty$ to $+\infty$), β_{ij} is item difficulty, and τ_j is the difficulty of being rated in category j rather than $j-1$

This can also be written as :

$$P_{ij}(\theta_n) = C_{ij}/(1 - C_{ij})P_{ij-1}(\theta_n) = exp[\upsilon_{ij}(\theta_n)]P_{ij-1}(\theta_n)$$

where the term $C_{ij}/(1 - C_{ij})$ represents the odds of choosing the j th category over the

$j-1th$ category. The logit is given written as :

$$log[C_{ij}/(1-C_{ij})] = \upsilon_{ij}(\theta_n) = \theta_n - (\beta_{ij} + \tau_j)$$

The GPCM is obtained by specifying a slope parameter, λ, which allows items to have different discriminating power. The slope parameter can also be interpreted as describing how an item is related to the trait measured by the scale. After normalizing each $P_{ij}(\theta_n)$ within an item such that $\sum P_{ij}(\theta_n) = 1$ the GPCM is then :

$$P_{ij}(\theta_n) = \frac{exp[\sum_{l=0}^{j}(\upsilon_{ij})]}{\sum_{k=0}^{m_i}[exp\sum_{l=0}^{k}(\upsilon_{ij})]}$$

where we adopt $\sum_{l=0}^{0}(\theta_n - \beta_{ij}) = 0$ for notational convenience, and $\upsilon_{ij} = \lambda_i\theta_n - (\beta_{ij} + \tau_j)$.

4.3.2. Estimation Method

The estimation strategy for this model consists in treating the latent trait parameter as an individual random effect. This allows to use a standard maximum likelihood approach to obtain the parameter estimates. The estimate score for each individual can be calculated using empirical Bayes methods. The means of the latent trait and random threshold variables are set to zero to identify the equation.

The analysis will be carried out in three steps. The first consists in testing whether the items used for the estimates are explained by a single trait dimension (the *unidimensionality* assumption). To this end, we use factor analysis to identify the dimensions of the item. In the second step, the goodness of fit of the model is assessed. In the third step, the obtained latent-trust score is compared to experimental behavior.

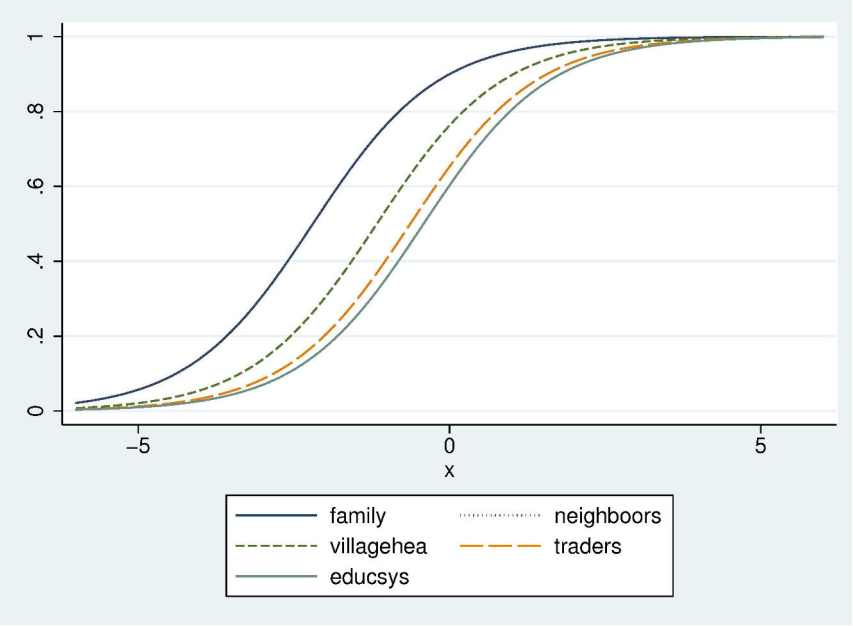
4.4. Results

The first step in the analysis is to use factor analysis to test whether the estimated score satisfies the *unidimentionality* assumption. The factor-analysis results are showing in Table 4. The factor loading for each item is expressed relative to a reference item for which the factor loading is standardized to 1. A factor greater than 1 indicates that the corresponding item is more strongly associated with the underlying latent trait than the reference item. For example, the items "*trust in friends*" and "*trust in close family*" are much more strongly associated with the latent trait that the reference item, "*trust in foreign strangers*". Similarly, the items representing trust in institutions and "*trust in strangers in the same ethnic groups*" are more strongly associated with the latent trait of trust than the reference item. Only "*Trust in strangers in other ethnic groups*" is less strongly associated with the latent trait than "*trust in foreign strangers*", the reference item.

Figures 4.1 and 4.2 describe the relationship between the latent trait and the probability of being trusting towards the particular group mentioned. The latent-trait scores where the curves cross the 0.5 probability line represent the degree of difficulty of the items. The higher is this value, more difficult is the item. Table 4.2 shows the item parameter estimates and threshold parameter estimates for the eight items. While the step categories within items do not vary across items, the estimate of the first step category is sufficient to compare item difficulty. For example, the item "*trust in close family*" is "*easier*" than "*trust in village head*" and "*trust in neighbors*" (Figure 4.1) given the same latent trait. Individuals can more easily rank people from their close family than their neighbors, foreign traders, people from their own ethnic group, and people from other ethnic groups respectively. This

confirms existing evidence that trust declines with social distance ((Cardenas, 2003) and (Etang *et al.*, 2011)).

FIGURE 4.1 – Item Parameters Difficulty Estimates 1

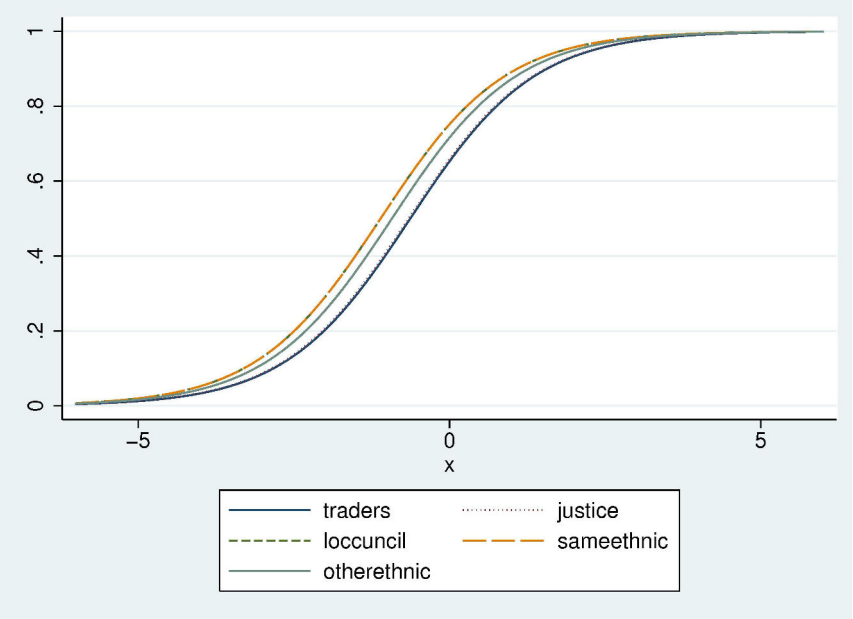


4.4.1. The estimate of the scores of latent trait trust

After estimating the model, the individual latent-trust scores are calculated using posterior probabilities. The obtained latent trait should be a continuous and normally-distributed variable. The normal Q-Q plot of the scores (in Figure 3) indicates that the normality assumption likely holds.

The estimated parameter is divided into four quartile groups of individuals. We characterize each group of the latent trust score by estimating the socio-demographic determinants of the probability of group membership. The results from multinomial logistic regressions

FIGURE 4.2 – Item Parameters Difficulty Estimates 2



appear in Table 5, where the first quartile is the base category. The results show that only age and family size significantly and positively affect all quartiles. Income has a positive and significant effect in quartiles 2 and 3 relative to quartile 1, but becomes negative in the fourth quartile. Individuals in the top income class compared to the bottom income class are more likely to be at the bottom of the latent-trust group (the first quartile). The same negative correlation between income and the probability of being in a higher latent-trust group is found even when the second or third quartiles are taken as the base category. The effect of education is somewhat mixed. High education has a positive effect on the probability of being in the second or third quartiles compared to the first quartile (the lowest level of the latent trait), but no effect on the fourth, last, group. Overall, only age and larger families increase the probability of being in a high latent-trait group ; other variables have only a more limited effect.

TABLE 4.2 – Parameters estimated of the latent trait

Variable	Coefficient	(Std. Err.)
Traders	-0.630**	(0.096)
Family	-2.195**	(0.183)
Neighbors	-1.168**	(0.126)
Villagehea	-1.354**	(0.135)
Education	-0.417**	(0.093)
Justice	-0.656**	(0.097)
Loccouncil	-1.107**	(0.115)
Co-ethnic	-0.925**	(0.104)
Otherethnic	-0.400**	(0.092)
Step2	0.737**	(0.117)
Step3	0.332**	(0.102)
N	9612	
Log-likelihood	-2822.238	

Significance levels : † = 10% ; ∗ = 5% ; ∗∗ = 1%

4.4.2. The goodness of fit

The goodness of fit of the GPCM is usually assessed item by item, by comparing the observed performance of the different-ability subgroups to predicted performance under a chosen model. As described in Muraki (2009) and Stone & Hansen (2000), this procedure consists of a number of steps. The first consists in estimating the item and ability parameters. The expected *a posteriori* estimated (EAP) Score is typically used as the ability estimate of individuals. Individuals are classified into W homogeneous-ability subgroups as an approximation of the continuous θ_n distribution. After classifying individuals in terms of their estimated abilities, we construct an observed-score response distribution for each subgroup by cross-classifying individuals using their estimated theta and their score responses. The expected-score response distribution is then formed by score category for an individual item using the item and theta parameter estimates under the model of interest. In the final step, we compare the observed and predicted scores response distributions.

This comparison can be carried out by calculating a Chi-squared based statistic for each individual item, or by examining the residuals. A number of Chi-squared based item-fit indices have been developed, with the most popular being the Q_1 of Yen for dichotomous items and the G^2 log-likelihood Chi-square for dichotomous and polytomous items. For a given item i, the G^2 index is calculated as :

$$G^2 = 2 \sum_{Wi}^{w=1} \sum_{Zi}^{z=0} r_{iwz} ln \frac{r_{iwz}}{N_{iw} P_{iz}(\overline{\theta_n})}$$

where w represents the number of subgroups that can vary across items, z is the item score ranging from zero to the highest item score Z_i, r_{iwz} is the observed number of individuals scoring z in group w, N_{iw} is the total number of individuals in group w and N_{iw} is the response function for item score z evaluated at the mean ability of individuals in group w. The degree of freedom of G^2 is equal to W, the number of subgroups.

TABLE 4.3 – Goodness of fit : LR-test

Variable	G^2	***df***	Pvalue
Traders	639,98	30	p>0.1
Family	11819,21	30	p>0.1
Neighbors	1535,47	30	p>0.1
Villagehea	4365,92	30	p>0.1
Education	307,00	30	p>0.1
Justice	604,81	30	p>0.1
Loccouncil	604,81	30	p>0.1
Co-ethnic	2544,25	30	p>0.1
Otherethnic	1553,62	30	p>0.1

Table 4.3 shows the goodness of fit test for each item : none of the 9 items used was considered to be a bad fit by the G^2 test. For the item "trust in foreign traders", for example, the goodness of fit statistic G^2=639.98 with 30 d.f (p-value>0.10), indicating that there are no significant difference between the expected and observed response probabilities.

4.4.3. The relationship between the measures

In this section, trust measured as a latent trait is used to predict behavior in the experiment and the answer to the GVS question. The experimental measure of trust is a version of the Berg *et al.* Trust Game. In the experimental literature on trust, including Berg *et al.* (1995) in Zimbabwe and Cox (2004), Barr (2004) and Sapienza *et al.* (2007), the Berg *et al.* (1995) trust game is mostly used to elicit trust. In the experiment, subjects play with randomly-selected members from their own community. The subjects know that they are playing with community members but do not know the identity of their opponent. Subjects play with their own village members did not know who their opponent was. Subjects are identified by code numbers and they are not allowed to communicate until the end of experiments. At the beginning of the experiment, two envelopes, with a subject identification number, are distributed. One of the envelopes contains an endowment of 1000 FCFA, the local currency corresponding to about 2.3 dollars. The subjects have to decide how much she/he wants to sent to her/his opponent by putting the amount in the empty envelope. The envelopes are recuperated before that the amount is multiplied by three by experimenters in another room. While theory predicts that second player will keep everything and repay nothing, the first players in the experiment sent on average over 50 percent of their endowment. Only 41 of the 268 subjects received less than they sent.

In this paper, subjects know that they are playing with members of their own communities, and their behavior may be governed by the rules and norms in their community. However, some work here has shown that trusting behavior in the trust game, in general, may be explained by personality traits. We then carry out an OLS regression of the amount sent in the experiment on the latent-trust score divided into quartile groups, taking the

first as the reference category. The results appear in the first column of Table 6. There is a positive and significant relationship between trusting behavior in the experiment and trust measured as a personality trait. While individuals in the second quartile group of individuals send statistically less money in the trust game than those in the base category, the third and fourth quartiles send significatively more than those in the base category. An increase of one point in the latent-trust difference between the first and second quartiles reduces the amount sent by 11.3 points in the trust game, while an increase in the difference between the third and fourth quartiles increases the amount sent respectively by 25 and 33. The second column of Table 6 shows the results from the logistic estimation of the response to the GVS question to latent trait trust. In contrast to the experimental trust measure, the second quartile group of latent trust, as compared to the first quartile, is no different regarding the GVS survey question. However, the effect of the latent trait is positive for the third quartile compared to the first, suggesting that a higher level of the latent trait reduces the odds that most people can be trusted.

4.5. Conclusion

The aim of this paper was to investigate whether trust can be measured as a latent trait, and how this relates to other trust-measurement methods. For this purpose, a class of latent trait model formulated by Muraki (2009), the Generalized Partial Credit Model, is used to construct the latent trait. The choice of this method is justified by a number of advantages over other methods. Under this approach, a score is constructed in order to measure the latent trait in each individual, and the trait level estimates depend on both

individual responses and the properties of the questions that were administered.

The validity of this method is assessed by building a score of latent-trait trust which is related to trust behavior in an experiment. The results show a positive and significant relationship between trusting behavior in the experiment and trust measured as a latent trait, while the GVS question is weakly related to latent trust.

Although trust is often conceptualized as a social attribute in the social-capital literature, it is widely recognized that individuals differ in their willingness to trust. This claim suggests that economists can see trust as a latent trait of characteristics of individuals, as do psychologists. The relative lack of interest in Economics may be explained by the unfamiliarity of economists with latent-trait measures. The integration of these methods into the substantial research literature on trust measurement can enhance the quality of trust measurement as well as our understanding of the motivations behind trust behavior.

Appendices

Table 4 – Factor Analysis

Variable	**Load**	**(Std. Err.)**
Trust in Close Family	2.01	(0.93)
Trust in Neighbors	2.70	(0.98)
Trust in Village header	2.49	(0.99)
Trust in Public education system	1.20	(0.53)
Trust in Justice court	1.08	(0.50)
Trust in Local council	1.75	0.75)
Trust in Same national ethnic groups	1.32	(0.51)
Trust in Foreign traders	1	(1.55)
Trust in Other national ethnic groups	0.98	(0.40)

TABLE 5 – Estimation results from a multinomial logit (base = first quartile)

Variables	Latent_trust_2	Latent_trust_3	Latent_trust_4
Income			
Middle class	1.300**	0.816**	0.212**
	(0.089)	(0.083)	(0.080)
Upper class	0.775**	0.536**	-0.234**
	(0.087)	(0.080)	(0.079)
Age			
Adults	-0.628**	-0.540**	-0.442**
	(0.076)	(0.071)	(0.072)
Older	0.420**	0.229**	0.484**
	(0.073)	(0.073)	(0.073)
Education			
Primary school	0.082	0.192**	-0.262**
	(0.078)	(0.074)	(0.078)
High school	1.088**	0.350**	0.005
	(0.113)	(0.121)	(0.125)
Family size	-0.296**	-0.437**	0.335**
	(0.064)	(0.062)	(0.064)
Male	-0.308**	-0.139*	-0.126†
	(0.066)	(0.065)	(0.066)
Intercept	-0.614**	-0.184*	-0.109
	(0.099)	(0.091)	(0.089)
N	9612		
Log-likelihood	-12832.819		
$\chi^2_{(24)}$	983.005		

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

This table shows multinomial estimation results. The dependent variable is the quartile of the distribution of the latent-trait score. Standard errors are in parentheses. The first quartile of the trust score is the reference category. The individual controls are income, age, education, family size and sex. Income is divided in three equal categories, and low-income is the reference category. For education, the base category is individuals with no educations, for age the base category is individuals under 30 years old. Adults are individuals aged 30 to 50, and the older are those over 50.

FIGURE 3 – Q-Q normal figure for the latent trait

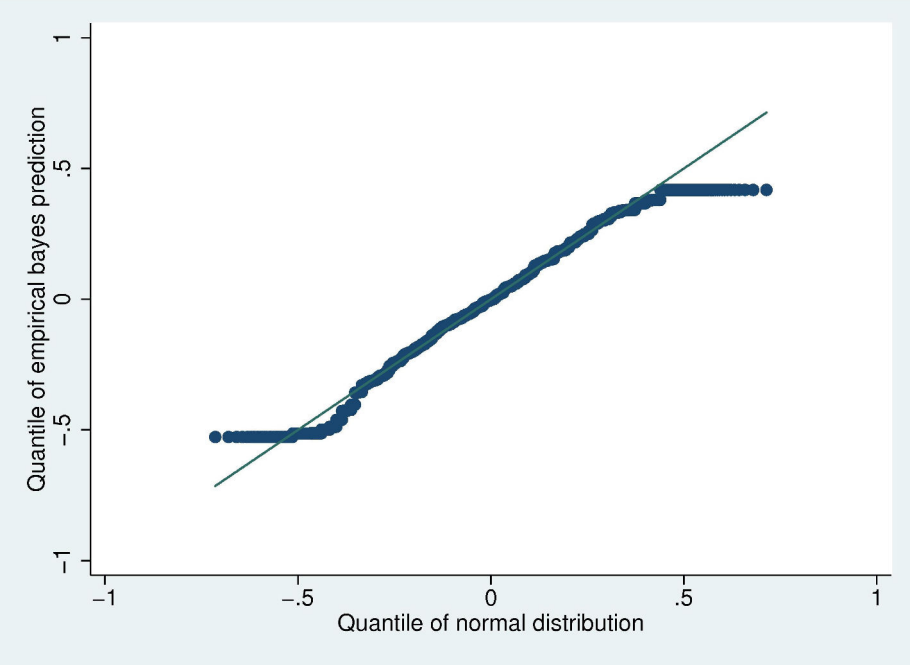


TABLE 6 – Amount sent and WVS by latent trait

Variable	CCT	WVS
Latent_trust		
Latent_trust_2	-11.266†	0.479
	(6.609)	(0.061)
Latent_trust_3	25.370**	0.475**
	(6.716)	(0.061)
Latent_trust_4	33.999**	-0.042
	(6.691)	(0.062)
Intercept	511.846**	0.265*
	(10.642)	(0.110)
N	9432	9432
R^2	0.034	
Log-likelihood		-6264.095
$\chi^2_{(9)}$		326.63

Significance levels : $\dagger$: 10% $*$: 5% $**$: 1%

The first column of the table shows the OLS estimation results and the second a logistic regression of the WVS score. The dependent variable is the amount sent in the trust game. The first quartile of latent-trait trust is the base category. The individual-level controls are age, education, income and sex. Standard errors are in parentheses.

Troisième partie

Trust, local public goods and ethnic division

Chapitre 5

Social capital and primary health care systems in Sub-saharan Africa

5.1. Introduction

Starting with China's barefoot doctors, [1] the provision of basic health care at the local level has been an innovative way of improving health in poor areas. The Alma-Ata international conference in 1978 acknowledged the success of local primary health care systems and recommended their generalization across the globe. Thirty years later, the Director-General of the World Health Organization pointed out that international evidence overwhelmingly demonstrates that health systems concentrating on primary health care produce better outcomes, at lower costs, and with greater user satisfaction. This consensual principle of providing elementary health facilities at the local level was reinforced in sub-Saharan Africa, where a long list of international, national and NGO-supported programs were designed to encourage communities to produce basic local public goods themselves. African Communities are faced with limited government resources and need to organize themselves to provide health services to community members. It is thus no exaggeration to state that basic health services are now in community hands in sub-Saharan Africa.

As a result, it is the community's ability to engage in collective action (e.g. by maintaining health facilities) and promote the relevant social norms (e.g. introducing sound hygiene practices) which appear crucial for health improvements in Africa. This ability is often referred to as social capital. Intuition suggests that communities with more social capital should be better at providing local health services, all else equal. We here use cross-country data from sub-Saharan Africa to test this hypothesis.

1. Barefoot doctors were farmers in the People's Republic of China who received minimal basic medical and paramedical training for six months. They worked in rural villages, starting in the 1930's. Their goal was to bring health care to rural areas where urban-trained doctors would not settle. They promoted basic hygiene, preventive health care and family planning, and treated common ailments.

A considerable amount of research over the past few decades has emphasized the role of trust and social capital in encouraging development Putnam (2000). Most of the work linking cultural values to economic outcomes has focused on Western countries and finds that the two are indeed related (see Algan & Cahuc (2013) for a survey). Whether social capital plays a similar role in Africa remains an open question. To date, the impact of social capital in Africa has mostly been assessed in one singly country, or across a few communities (Yamada (2013)).

We here use data from the Afrobarometer to test the determinants of health-center quality and health-related behaviors, paying particular attention to social capital. Following a now well-establishes tradition (Algan & Cahuc (2013)), we proxy social capital by the average level of trust. We use several measures relating to local health services and health-related behaviors : the household adoption of health-related behaviors and hygienic practices, community-level access to improved drinking water, and the quality of health centers.

The empirical analysis of the effect of trust and ethnic diversity on the quality of community governance does pose potential endogeneity problems : trust and the quality of local governance may be mutually reinforcing. It is possible that those individuals with more social capital people will be more likely to participate in the provision of public goods, but at the same time those who are more involved in public-good activities will create more social links and have more trust in others. This simultaneity mechanism will positively bias the social-capital coefficients in a health regression. Fractionalization may also potentially be endogenous. The systematic sorting of individuals from particular origins, or with certain unobserved tastes for public goods, into more or less diverse areas can potentially

introduce omitted-variable bias into the cross-section estimation of the effect of diversity on health-center quality (Glennerster *et al.* (2013) and Algan *et al.* (2013)). Our strategy is to use an instrumental-variable (IV) approach. We construct a measure particular to each ethnic group, called "inherited trust" to instrument current trust levels. To this end, we use the data on historically-determined patterns of ethnic land settlement collected by Murdock (1967). We assume that individuals' trust levels are inherited along ethnic lines, in the spirit of Nunn & Wantchekon (2011) who underline the impact of the slave trade on contemporaneous trust levels in Africa. Inherited trust can be assumed to affect current trust, but not to be correlated with our variables of interest, namely those on health-center quality. As such, inherited trust is a valid instrument. For fractionalization, we use initial population density as an instrument.

We find our measures of local trust have a *causal* impact on household health-related behaviors, community access to improved water, and health-center quality. One percent higher local trust reduces doctor absenteeism by .421 percent, waiting time by 0.57 percent, illegal payments by 0.512 percent, and lack of attention by medical staff by 0.738 percent. Ethnic fragmentation and generalized trust play only marginal roles. We also appeal to a set of other controls to see whether a selection effect is at work. The effect of trust is robust to various model specifications and sets of controls. We also find that OLS estimation underestimates the effect of trust on public-goods quality. We attribute this bias to measurement error in the trust variable and the existence of local clubs which positively affect the quality of pubic goods but which reduce trust.

The remainder of the paper is organized as follows. Section 2 provides a review of the literature on the relationship between trust and the quality of public goods. The historical

background justifying the use of inherited trust appears in Section 3, and Section 4 describes the survey data and sets out the variable definitions. The econometric specification and controls are presented in Section 5, and the results appear in Section 6. Last, Section 7 concludes.

5.2. Health system decentralization in sub-Saharan Africa : the emergence of District Health Centers

The health systems in sub-Saharan Africa are generally considered to be the worst-performing in the world, even compared to other developing countries (South America or Asia). Despite the assistance of many NGOs, a considerable part of the population still has no access to primary health care. For example, the likelihood that a child in a poor country lives to age 5 and that an adult live to age 50 is substantially lower than in a rich country. What explains poor African performance in terms of access to health care ? For many diseases, the adoption of simple health-related behaviors such bed nets, water-treatment products, immunization or other preventative behaviors can significantly reduce the probability of death from malaria, diabetes and diarrhea. Morel et al (2005) show that the use of insecticide-treated bed nets can reduce malaria incidence by 50 percent and mortality by 20 percent. Water-treatment products can reduce endemic diarrhea by 37 percent. Despite these clear benefits, the utilization rate of water-treatment products in Africa is estimated to be 10 percent. The literature review in Dupas (2011) proposes a lack of information as one of the main reasons why households do not adopt these health-related behaviors (Jyotsna & Somanathanb (2008), Jyotsna & Somanathanb (2011)). Dupas (2011)

notes that work has suggested that developing-country households often lack information on the returns to investment in preventive behaviors, and their health behavior is very sensitive to information. However, this information must be seen to be credible to affect behavior. In this context, social capital may well play a role in facilitating individual access to relevant health information. In a context of asymmetric information between health-care providers and consumers, social capital can help individualsâĂŹ access information on how to cure or prevent diseases, the best remedies, and the best hospitals and doctors. At a more aggregate level, social capital may also allow the local population to coordinate their efforts and put pressure on the government to provide health-promoting public goods, for example, health infrastructure and the better diffusion of information. These kinds of investments are essentially non-exclusive public goods, which benefit all individuals irrespective of their lobbying efforts.

We expect that the local ability to manage community health centers will depend considerably on their ability to avoid free-riding, reach consensus among their members and enforce collective norms. However, one important aspect of social life in sub-Saharan Africa is ethnic division. At the country level, there is overwhelming evidence that more heterogeneous countries have worse economic performance (Alesina *et al.* (1999) ; Easterly & Levine (1997) ; Alesina & La Ferrara (2000) ; Haddad & Maluccio (2003)). These country-level findings are repeated at the local level (see for instance the case studies in Miguel & Gugerty (2005), Algan *et al.* (2013)). The production of local public goods is thus sensitive to ethnic diversity. The data used here reveal that about 70% of our 1355 districts are multi-ethnic. Green (2012) notes that more than 177 ethnic groups, representing 43 percent of the African population, are split across two and sometimes three colonial borders. We

need to understand how communities made up of different ethnics can reach the agreements necessary for collective action. Miguel & Gugerty (2005), for example, report that in Matumbai's primary health center in Kenya, parents refused to participate in fund-raisers and the community in health-center meetings because of a lack of trust between ethnic groups. Furthermore, in ethnically-diverse Kenyan villages, where community cohesion and trust are lacking, informal sanctions imposed are usually ineffective in pressuring individuals to contribute to the public good.

Loosely speaking, we consider the ability of multi-ethnic communities to overcome their divisions to build social capital. Social capital is a broadly-defined notion which helps us to understand what connects individuals within a community. The celebrated work of Putnam (2000) and Coleman (1990) explained societal evolution via social capital. However, economists have been reluctant to use social capital as it is hard to define and, thus, to measure. The emerging field of cultural economics has however been successful in providing quantitative evidence showing that inherited values do explain some current important economic variables. Much attention has so far been devoted to one particular aspect of social capital, namely trust. Of course, trust, as measured by survey questions, is certainly an imperfect proxy for social capital (whatever the definition retained). However, there is considerable consensus that trust can be measured using the so-called generalized trust question. Respondents are asked "*Generally speaking, would you say that most people can be trusted, or that you cannot be too careful in dealing with people ?*". Respondents reply either "*Most people can be trusted*" or "*Cannot be too careful dealing with people*". Local social capital is then proxied by the percentage of respondents who agreed that must people can be trusted. Note that this variable can be interpreted both as measuring

beliefs others' honesty, as well as how much the individual respondent values honesty and trustworthiness. So although what it is that is measured by the generalized trust question is open to debate, it certainly has something to do with the ability to produce the key ingredients needed to undertake collective action, such as shared values or the ability to enforce collective norms. Furthermore, as stated by Uslaner (2008b), "*generalized trust is a value that leads to many positive outcomes for a society - greater tolerance of minorities, greater levels of volunteering and giving to charity, better functioning government, less corruption, more open markets, and greater economic growth.*"

However, both fractionalization and social capital are potentially endogenous. Trust and the quality of governance are likely mutually reinforcing, and the systematic sorting of individuals from a particular origin, or with certain unobserved tastes for public goods, into more or less diverse areas could potentially introduce omitted-variable bias into the cross-section estimation of the impact of diversity on the quality of health centers (see Michalopoulos (2012) for Sierra Leone and Algan *et al.* (2013) for France).

5.2.1. Addressing endogenous residential sorting

The estimation of the impact of ethnic division on the quality of public goods is complicated by possible endogenous residential sorting. If some individuals choose their current residence according to some unobservable characteristics it is difficult to separate the effect of ethnic diversity from these unobserved characteristics. Endogenous sorting is likely to bias our estimates downwards, as individuals who move to more heterogeneous communities because of their preference for public goods are also more likely to increase diversity as the quality of public goods rises.

To understand how endogenous residential sorting works, we first note that Africa was originally constituted in part by ethnic territories which were slightly more homogeneous than the current very heterogeneous countries, as represented by Murdock (1967) in Figure 6.1. Current ethnic fractionalization in Africa is not random, and previous research has underlined the roles of climate, geography, institutions and history to this extent. While differences in preferences have certainly had a significant impact on migration in Africa, there is also evidence that other factors, often related to history, have "*forced*" people to migrate. However, many of these factors (which caused the current emergence highly-fractionalized countries) also affected public goods Easterly & Levine (1997), Nunn (2008)). Establishing a causal relationship between ethnic diversity and the quality of public goods has to account for endogenous sorting. We adopt two strategies to address this problem.

The first consists in identifying the determinants of the choice of residential ethnic territories and to control for them. To this end, we estimate a conditional logistic model of residential choice, and identify two major factors : the actual distribution of public goods across areas, and other factors that may indirectly determine the local level of public goods such as slave raids in the pre-colonial period (Nunn (2008)), and the presence of missionaries and settlers in the colonial period (Easterly & Levine (1997)). Our variables measure whether early European explorers contacted the individual's ethnic group, whether the ethnic territory was connected to the colonial railway network, the deadliness of the disease environment, and the historical exposure of the ethnic group to the transatlantic and Indian Ocean slave trade. We also measure the ethnic group's initial disease environment using the malarial ecology of the local area (Nunn & Wantchekon (2011)). Finally, we control for the distribution of public goods across ethnic territories, defined as the percentage of

the population who have access to certain infrastructures within walking distance. Table 5.1 shows, as expected, that there is a significant preference for living in areas with more public goods. All the coefficients on the public-good variables are significant and positive. The results also show that individuals are less likely to move to regions where the slave trade was more intense. The coefficient on the slave trade (the log of the number of slaves captured by area) is negative and very significant. The other factors affecting individual preferences for moving are the presence of colonisers, railways and a city in the pre-colonial era. These results are consistent with the hypothesis that individuals are more likely to move to places where there was previously colonial investment. This systematic sorting of individuals via tastes for public goods could potentially introduce omitted-variable bias into the cross-section estimation of the impact of diversity on the quality of health centers. We address this problem using an instrumental variables (IV) strategy.

5.2.2. Data and variable definitions

Our analysis uses the third round of the Afrobarometer (2008). Afrobarometer data comes from nationally-representative samples of primary sampling units (PSUs) selected with a probability proportional to population size (a minimum of 1200). We here use data from 16 countries : Benin, Botswana, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, South Africa, Tanzania, Uganda and Zambia. [2] Data are available at the district level, which is the smallest administrative level within a country, and cover more than 1335 districts. The surveys were face-to-face in the respondent's language of choice. The third round of the Afrobarometer collected information on

2. Zimbabwe is excluded from the sample because the general-trust question was not asked there ; Cape Verde is excluded because ethnic groups are not identified in this country.

TABLE 5.1 – Estimation results : clogit

Variable	Coefficient	(Std. Err.)
Dist_school	1.390**	(0.111)
Dist_electricity	0.732**	(0.155)
Dist_health	1.380**	(0.176)
Dist_road	0.259	(0.180)
Dist_Recrea_facilities	0.924**	(0.151)
Near_dist	-0.001**	(0.000)
Explorer_contact	0.899**	(0.083)
Railway_contact	0.196*	(0.078)
Saharan_node	-0.005**	(0.002)
Saharan_line	0.005**	(0.002)
Land	0.000**	(0.000)
Ln_exports	-0.481**	(0.021)
Total_missions_area	-97.466	(92.278)
Cities_1400_dum	0.248*	(0.108)
N	15833	
Log-likelihood	-7562.22	
$\chi^2_{(14)}$	1499.718	

Significance levels : † = 10% ∗ = 5% ∗∗ = 1%

some individual-level indicators of social capital, livelihoods, and the perception of democracy. The descriptive statistics of the socio-economic variables in the sample appear in Table 2.

Information on historical settlement patterns are drawn from the ethnographic Atlas of Murdock (1967), which compiled a great deal of ethnographic work into one database and classified 1.167 societies around the world according to culture and societal institutions. This database contains information on the pre-colonial conditions and characteristics of many ethnic groups and tribes within Africa. Additional information on the historical emplacement of ethnic groups' homelands and their current locations are drawn from Nunn & Wantchekon (2011)'s seminal paper on the impact of the slave trade on mistrust in Africa.

The indicator of the quality of health-clinic management is drawn from the Afrobarome-

ter. This contains seven questions about the quality of local health centers. The following questions were asked : "*Have you encountered any of these problems with your local public clinic or hospital during the past 12 months*" : *1. Services are too expensive or Unable to pay* ; 2. *Lack of medicines or other supplies* ; 3. *Absent doctors* ; 4. *Lack of attention or respect from staff* ; 5.*Long waiting times* ; 6. *Demands for illegal payments* ; and 7. *Dirty facilities*

We use two trust indicators : generalized trust and trust in neighbors. The first, generalized trust, is measured using the General Value Survey (GVS) trust question. This comes from the following question "*Generally speaking, would you say that most people can be trusted, or that you can not be too careful in dealing with people ?*". Respondents reply either "*Most people can be trusted*" or "*Can not be too careful dealing with people*". The local trust level thus comes from the percentage of respondents who state that "*Most people can be trusted*". This trust measure is by far the most commmon in empirical work, and is often presented as a proxy for social capital. However, generalized trust has been the subject of much debate in the literature. A number of researchers have argued that the trust questions are too abstract (Glaeser *et al.* (2000), Nannestad (2008), and Sturgis & Smith (2010)) and do not yield good measures. Despite these problems, Tabellini (2008) has argued that the GVS question is an indicator of moral values that is transmitted from one generation to another. The second indicator is trust in neighbors. The exact question wording is : "*How much do you trust each of the following types of people : Your neighbors ?*". Respondents choose between four possible answers : (i) not at all, (ii) just a little, (iii) somewhat, or (iv) a lot.

The ethnic fractionalization index measures the probability that two randomly-selected

individuals be from a different ethnic group (Easterly & Levine (1997), Alesina *et al.* (2003)), and is defined as $1 - \sum_{e=1}^{N} s^2$ (where s is the district share of the ethnic group).

Data on access to water are calculated from nationally-representative samples in surveys V and VI of the Demographic and Health Survey across 13 countries. [3]. From the GPS coordinates collected by investigators, we can identify districts that correspond to those in the Afrobarometer. We use this information to construct two variables measuring improved water access. The first indicates whether households use water-treatment products to improve drinking-water quality when their drinking-water source is unprotected. The second is the local population percentage who have access to a protected water source (well, borehole or spring), as opposed to those whose drinking water comes from an unprotected source.

5.2.3. Empirical strategy

Three types of outcomes are considered : the household adoption of health-related behaviors and hygienic practices, access to improved sources of drinking water, and health-center quality.

Access to improved sources of drinking water is first captured by the household use of water-treatment products to improve drinking-water quality they use unprotected water sources. We test whether local social capital and ethnic fractionalization affect this basic sanitary behavior. We estimate the following equation at the household level, controlling for a certain number of household and community characteristics (see Table 2 for the

3. Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, Tanzania, Uganda and Zambia

descriptive statistics of these controls).

$$B_{i,j} = \delta_{0,i} + \delta_{1,i}X_i + \delta_{2,i}Trust_j + \delta_{3,i}EFI_j + \delta_{4,i}Y_j + Country\_FE + \varepsilon_{i,j} \quad (5.1)$$

equation

Here $B_{i,j}$ denotes the behavior of household i living in are j. $Trust_{i,j}$ is individual-level trust, and $Trust_{c,d}$ is district-level trust. Generalized trust ($Trust_{GVS}$) and trust in close neighbors ($Trust_{neigh}$) will be considered separately. $EFI_{c,d}$ is the ethnic fractionization index, $Y_{j,c}$ are the district-level controls, ε is an unobserved error term, while δ_i are the parameters of interest.

The second variable of access to improved water is local percentage using improved drinking water sources : public standpipes, boreholes, protected dug wells and protected springs. Our last measure concerns health-center quality, and comes from the seven questions described above : health-center services are too expensive (EXP), Lack of medicines/supplies (MES), Lack of attention/respect (PHC), Doctor absenteeism (DABS), Long waiting times (LWC), Dirty facilities (DFE), and problems of illegal payments (ILP).

As these last two public-good variables are at the district level, we estimate the following equation.

$$\omega_{c,d} = \pi_0 + \pi_1 Trust_{c,d} + \pi_2 EFI_{c,d} + \pi_3 X_{c,d} + \varepsilon_{c,d} \quad (5.2)$$

Here $\omega_{c,d}$ is the public-good indicator and the other variables are as described in equation 1.

5.2.4. Instruments

If, as we assume, trust and ethnic division are endogenous, the OLS estimation of their coefficients will be not consistent : we therefore appeal to instrumental variables. Our instrument has to satisfy two requirements : it must be relevant (i.e. correlated with the endogenous variable) and exogenous (i.e. it affects trust only through the instrumented variable).

Our instrument for current trust is inherited trust : this is particular to specific ethnic groups and is likely to have been shaped over the long run, before modern states were established. A number of recent pieces of work have provided evidence that inherited trust explains current economic outcomes ((Guiso *et al.*, 2007), Tabellini (2008), Algan & Cahuc (2010)). Uslaner (2008b) has shown that a considerable fraction of an individual's current trust can be explained by trust in the ancestral homeland. Using similar data to that here, Nunn & Wantchekon (2011) show that current trust is rooted in long-term history, namely the slave trade. Applying the same logic here, inherited trust be inferred from the level of trust in the historical ethnic homeland. This trust level that individuals inherited *via* their ethnic groups instruments current trust.

Inherited trust is calculated from historical ethnic data on settlement patterns in Africa, taken from the ethnographic atlas of Murdock (1967), which is used to map the territory of many African ethnic groups before the formation of modern countries. We delimit 282 historical ethnic territories, as shown in Figure 6.1.

Each individual's inherited trust is the average trust level in his/her original ethnic group. For example, a member of the Bantu ethnic group who now lives in a Fon' ethnic group homeland will inherit trust given by the the standardized level of trust in Bantu ho-

melands. In this way, we bypass the problem of the mutual co-determination of trust and the quality of public goods. We thus require information on the historical ethnic origin of each individual. The main difficulty here is that some ethnic groups have split up into different sub-groups, while others have completely changed their names. We here use the information from Nunn & Wantchekon (2011) (available at http ://scholar.harvard.edu/nunn/pages/data-0) to link current ethnic groups to those identified in Murdock (1967). We calculate inherited trust in the ethnic homeland as the average trust level of the individuals who still live there. Inherited trust at the district level is the average of respondent's inherited trust, weighted by the relative size of each ethnic group in the district.

The fractionalization instrument is the logarithmic of the initial density of the population in the colonial period. This choice comes from Green (2012), who shows that initial population density is inversely correlated with fractionalization : low initial density forced settlers to create large and fractionalized States.

In the first two columns of Table 6, the dependent variable is general and neighbor trust, and the first-stage estimations for ethnic diversity appear in the third column. The F-values for the excluded instruments show that our instruments are sufficiently informative. A one standard deviation rise leads to a .36 standard deviation increase in the predicted value of current district generalized trust. The result is even stronger for trust in neighbors, with an analogous figure of .53 standard deviations. For both trust measures, the models indicate no problems of weak instruments.

5.3. Access to improved water

We now test whether social capital and ethnic diversity determine the adoption of this health behavior. We thus estimate equation 6.1 controlling a for a number of household and district-level characteristics.

We first show OLS results in the first column of Table 5.5. We find no significant effect of either trust or the EFI. The only two significant variables in this specification are wealth and education. The effect of wealth is substantial and very significant ($p<0.001$). Education also significantly affects the index of water treatment, with an effect that is significant as that of wealth. In the third column of the table, we show the effect of generalized trust on the water-treatment index, controlling for a variety of household and district characteristics. In contrast to trust in neighbors, generalized trust affects water treatment at the 95 percent significance level.

The IV estimates appear in the second and fourth columns of Table 5. The test statistics indicate the presence of endogeneity, and reject the null hypothesis that OLS is consistent : the IV estimates are thus preferable. Here trust is instrumented by inherited trust and EFI by initial population density. The estimated coefficients in the IV regressions are larger. All trust variables are now significant. This suggests that OLS estimates are downward-biased : for example, the estimated generalized-trust coefficient rises from 0.094 to 0.241. A one percent rise in trust in neighbors increases the water-treatment index by 0.09 percent, with an analogous figure for generalized trust of 0.24 percent. The estimated EFI coefficient remains insignificant.

Table 5.6 shows the improved safe drinking water results. We here estimate equation 5.2

in Section 5.2.3. OLS estimation (in columns 1 and 3) produces insignificant estimates on all our variables of interest : only urbanization explains access to improved drinking water. Here IV estimation does not change the results much : only the estimated coefficient on trust in neighbors becomes significant at 95 percent level.

Overall, household adoption of health-related behaviors is mainly driven by education, wealth and social capital. The results presented here suggest that trust causally affects the adoption of these health-related behaviors. At the local level, however, we do not find a strong relationship between trust and access to protected water sources ; this later seems to be mainly explained by urbanization.

5.4. Health system quality

Our goal here is to determine the causal relationship between trust and the quality health services. We first estimate health quality on generalized trust, trust in neighbors and EFI without any controls, and then gradually introduce the various controls to see how our estimated coefficients change.

In Table 3, we present the results of the estimation of health-center quality on generalized and local trust. In the top panel, the coefficients on generalized trust are positive and significant for four of the seven health-quality indicators, and those on local trust (in the bottom panel) for six of the seven indicators. In contrast to trust, fractionalization has no effect.

We now add more controls, including current district characteristics of districts such as a wealth index, median age and other indicators relating to social capital and historical variables. The results appear in Table 5.7 for generalized trust and Table 5.8 for local trust.

The effect of generalized trust falls, but remains significant, while that of local trust is only little-affected. The estimated EFI coefficient remains insignificant for all seven health-center quality indicators.

We now turn to the IV estimation results. We first consider the results of the Durbin-Wu-Hausman tests, the p-values of which appear at the foot of the table. These test statistics reveal that we cannot reject the null hypothesis that the OLS estimations are consistent for Doctor absenteeism (DABS), Long waiting times (LWC), Dirty facilities (DFE) but for the other variables the IV is preferable.

The IV estimates appear in tables 9 and 5.10, respectively, for generalized trust and trust in neighbors. The IV results broadly confirm the positive and significant effect of trust on health-center quality. The IV coefficients are both more significant and larger, suggesting that OLS underestimates the true effect of trust on health-center quality. For example, the variable was not affected by the level of generalized trust has become significant in the estimation by the method of IV. We also find that the effect of EFI is much larger : this is now negative and significant for MES and positive for DABS.

We then introduce historical variables in tables 5.11 and 5.12. The controls are the former presence of colonisers, railways and the presence of a pre-colonial city, the deadliness of the disease environment and a measure of the historic exposure of the territory to the transatlantic and Indian Ocean slave trade.

With the inclusion of these additional controls, the effect of generalized trust on health-center quality disappears. This suggests that the effects found in previous estimates may be mostly due to the omission of these historical variables. The impact of EFI also becomes insignificant. Only the effect of the localized trust remain significant. As such, EFI

does not causally affect health-center quality, and the OLS correlations reflect omitted variables. However, trust in neighbors, our indicator of local trust, continues to causally affect health-center quality. In particular, we find that a rise of one percent in local trust reduces the problem of doctor absenteeism by .421 percent, waiting time by 0.57 percent, illegal payments by 0.512 percent, and the lack of attention by 0.738 percent.

We conclude then that only local trust is robust to all of our specifications and controls. The effect of generalized trust and ethnic division is only limited. We also note that, surprisingly, the OLS estimates of localized trust on the quality of public goods is downward-biased. Since we suspect reverse causality, we expected a positive rather than a negative bias. We provide two possible explanations of this negative bias. First, this can result from measurement error in local trust. As was shown in the part 2 of this thesis, the way that trust is measured by survey question is open to debate. It is not clear to what extent these survey questions can provide reliable measures of trust. The second explanation relies on the existence of exclusive club in the districts (like religious groups or Community Based Organizations - CBOs) which contribute to the quality of public goods and at the same time affect local trust. In some districts clubs may exist whose benefits are reserved only for members and which manage certain types of public goods such as wells, schools or health centers. Alesina & La Ferrara (2002) have shown that closed associations and clubs harm trust. If these associations and clubs reach a critical number, they can cause negative bias which is larger than the upward bias caused by reverse causation.

TABLE 5.2 – OLS estimation of the effect of trust on health-center quality

	EXP	MES	DABS	LWA	DFE	ILP	PHC
$Trust\_GVS$	.033	.259**	.168*	.357***	.137	.076	.367***
	(.0998)	(.1127)	(.0994)	(.1033)	(.0996)	(.0838)	(.0984)
EFI	.014	-.010	.149**	-.028	-.080	-.066	-.037
	(.0660)	(.0745)	(.0656)	(.0682)	(.0657)	(.0554)	(.0650)
Constant	-1.597***	-1.487***	-.767***	-1.192***	-.605***	-.629***	-1.152***
	(.0735)	(.0829)	(.0731)	(.0759)	(.0732)	(.0616)	(.0724)
Adj. R^2	.260	.144	.184	.267	.153	.175	.191
No.Obs	1067	1062	1064	1063	1063	1063	1064
T_{neigh}	.053	.081**	.091**	.141***	.152***	.183***	.215***
	(.0355)	(.0403)	(.0354)	(.0368)	(.0353)	(.0294)	(.0347)
EFI	.017	-.008	.153**	-.022	-.073	-.057	-.027
	(.0659)	(.0746)	(.0656)	(.0681)	(.0653)	(.0544)	(.0643)
Constant	-1.674***	-1.542***	-.866***	-1.317***	-.814***	-.906***	-1.394***
	(.0887)	(.1005)	(.0884)	(.0918)	(.0880)	(.0733)	(.0867)
Adj. R^2	.261	.143	.187	.268	.167	.204	.209
No. Obs	1067	1062	1064	1063	1063	1063	1064

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Standard errors are in parentheses. All regressions are OLS with country fixed effects. The dependent variables describe local health-center quality. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

5.5. Conclusion

This paper considered the determinants of community capacity to manage local public goods, focusing on the role of trust and ethnic division. We circumvent endogeneity problems caused by the co-variation of trust and the quality of public-good governance by using an inherited-trust variable. This strategy follows the same logic as in Algan & Cahuc (2010) and Uslaner (2008b), who show that trust is transmitted from generation to generation. Using information on the historical settlement patterns of ethnic groups in Sub-Saharan Africa, two measures of inherited trust are considered : trust in neighbors, and inherited generalized trust. These two inherited-trust measures are used to test the causal impact of trust on the quality of public-good governance across a large number of districts in sub-Saharan Africa. The results show that inherited trust from the ethnic homeland accounts for a large part of current trust levels.

Our results reveal that trust in neighbors (local trust) in the district affects both health-center quality and access to improved water ; ethnic diversity and generalized trust play only a limited role. Our use of instrumental variables suggests that this relationship is causal. We find no relationship between ethnic fractionalization and the quality of public goods at the local level. While this result goes against the current view in the literature, it is, however, consistent with what Glennerster *et al.* (2013) found in Sierra Leone. While much work has emphasized ethnic diversity as a factor behind poor economic outcomes of African countries, this does not seem to hold at the local community level. Local communities are seemingly better able to manage any adverse effects of ethnic division, with local trust (as a measure of social capital) playing a key role. In terms of policy recommendations, these

results are consistent with the greater autonomous management of public goods by local communities. Of course, national policies play an important if not crucial role, but since African countries face very often only limited resources, empowering communities may well produce more successful results.

5.6. appendices

TABLE 5.3 – Summary statistics

Variable		Mean	Std. Dev.	N
water-treatment products				
water-treatment index	57680	1.11	.3066	
Improved drinking water	659	.4743785	.3324124	
water-treatment products				
PHC	Lack of attention/respect	1.006	0.680	1331
ILP	Illegal Payments	0.560	0.563	1332
DFE	Dirty facilities	1.197	0.748	1333
LWC	Long waiting times	1.345	0.752	1331
DABS	Doctor absenteeism	1.002	0.643	1332
MES	Lack of medicines/supplies	1.118	0.693	1334
EXP	Health center too expensive	0.845	0.652	1334
District Level of trust				
$Trust_{GVS}$	Level of generalized trust	0.185	0.183	1327
$Trust_{neigh}$	Level of trust in neighbors	1.744	0.563	1263
Districts level characteristics				
EFI	District Level of ethnic fractionalization	0.313	0.279	1181
Dist_wealth	District level wealth index	0.014	0.429	1355
Median_age	Median age	34.785	7.971	1291
Prop_male	Proportion of men	0.493	0.117	1292
Prop_educated	Proportion of educated	0.643	0.317	1355
Prop_catholic	Proportion of Catholics	0.217	0.225	1292
Prop_protestant	Proportion of Protestants	0.123	0.177	1292
Prop_rural	Proportion in urban area	0.31	0.421	1292
Pay-bribe	Proportion who paid bribes	0.049	0.481	1355
Memb_farmer	Proportion in farmer grp	0.284	0.201	1355
Atten_protest	Proportion in protest	0.503	0.224	1355
Atten_rising	Proportion raise issues	0.831	0.174	1355
Atten_meet	Proportion attending meetings	0.898	0.139	1355
Memb_cbo	Proportion of member of CBO	0.328	0.211	1355
Memb_profes	Proportion in professional group	0.199	0.164	1355
Memb_religious	Proportion in religious group	0.756	0.212	1355
Dist_com_bldg	Distribution of community buildings	0.727	1.586	1355
Dist_health center	Distribution of health center	0.817	0.387	1169
Dist_Health_clinic	Distribution of health clinic	0.49	0.435	1264
Dist_Road	Distribution of road	0.366	0.43	1355
Dist_recrea_fa	Distribution of facilities	0.555	0.435	1333

TABLE 5.4 – First-stage regressions

	Model 1 b/se	Model 2 b/se	Model 3 b/se
trust_inherit_gvs	.669*** (.0797)		
trust_inherit_neigh		.683*** (.0822)	
ln_init_pop_densi	-.004 (.0077)	.004 (.0193)	-.069*** (.0114)
Wealth_index	-.055** (.0234)	-.122** (.0589)	.145*** (.0350)
Median_age	-.001 (.0009)	.002 (.0024)	-.004** (.0014)
Prop_educated	-.049 (.0358)	-.153* (.0901)	-.236*** (.0532)
Prop_catholic	.004 (.0332)	-.133 (.0836)	-.002 (.0508)
Prop_prothestant	-.000 (.0512)	-.215* (.1300)	.187** (.0771)
Prop_urban	-.010 (.0184)	-.066 (.0462)	.088** (.0276)
Attend_farmer	-.033 (.0407)	.054 (.1022)	-.048 (.0617)
Attend_protest	-.049 (.0349)	-.088 (.0878)	-.039 (.0528)
Attend_rising	-.104* (.0540)	-.148 (.1353)	-.013 (.0816)
Attend_meet	.104 (.0682)	.279 (.1713)	-.050 (.1039)
Memb_cbo	.055 (.0412)	-.106 (.1035)	.021 (.0623)
Member_farmer	-.000 (.0516)	.343** (.1297)	.126 (.0784)
Member_religious	.002 (.0345)	.102 (.0864)	.079 (.0524)
Prop_male	-.247** (.0878)	.038 (.2206)	-.091 (.1333)
Dist_Com_bldg	-.017 (.0166)	-.085** (.0418)	-.044* (.0252)
Dist_school	.002 (.0166)	-.073* (.0419)	.027 (.0250)
Dist_Health_c	.008 (.0164)	.037 (.0412)	.059** (.0249)
Export_area	.000 (.0115)	-.106** (.0335)	-.044** (.0164)
Missions_area	-14.092 (22.1882)	3.379 (55.6052)	96.484** (33.5687)
EFI	.024 (.0250)	-.041 (.0627)	
Constant	.359*** (.1025)	.585* (.3154)	.582*** (.1483)
Fstat	85.20	110.15	41.02
Adj. R^2	.339	.536	.339
No. of cases	726	726	739

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This table shows the results of OLS regressions. The dependent variables are generalized trust in Model 1, trust in neighbors in Model 2, and the fractionalization index in Model 3. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.5 – Estimation of the effect of trust on the use of water-treatment products

	OLS	IV	OLS	IV
Trust_neigh	.020	.090**		
	(.0174)	(.0414)		
Trust_GVS			.094**	.259**
			(.0417)	(.1142)
EFI	-.017	-.044	-.024	-.084
	(.0297)	(.0847)	(.0294)	(.0923)
Wealth_index	.010**	.011**	.009**	.009**
	(.0040)	(.0045)	(.0039)	(.0040)
Male	-.007	-.008	-.006	-.007
	(.0116)	(.0120)	(.0115)	(.0118)
Age	-.000	-.000	-.000	-.000
	(.0007)	(.0007)	(.0007)	(.0007)
Age2	-.000	-.000	-.000	-.000
education				
Primary	.019**	.020**	.019**	.020***
	(.0062)	(.0064)	(.0061)	(.0060)
Secondary	.025**	.029**	.024**	.026**
	(.0082)	(.0091)	(.0081)	(.0082)
High School	.040**	.046**	.042**	.051**
	(.0190)	(.0206)	(.0191)	(.0203)
Urban_dummy	.082***	.079***	.083***	.085***
	(.0188)	(.0195)	(.0183)	(.0188)
Prop_urban	-.011	.006	-.011	-.004
	(.0271)	(.0282)	(.0250)	(.0254)
Attend_rising	.002	.011	.003	.013
	(.0169)	(.0184)	(.0169)	(.0174)
Attend_meeting	-.049**	-.063**	-.045**	-.050**
	(.0221)	(.0254)	(.0207)	(.0213)
Attend_memb_cbo	.039	.046	.027	.011
	(.0475)	(.0509)	(.0497)	(.0573)
Dist_Recrea_facil	-.014	-.013	-.008	-.000
	(.0182)	(.0195)	(.0172)	(.0200)
Dist_road	.013	.008	.016	.024
	(.0195)	(.0227)	(.0195)	(.0226)
Export_area	.000	.003	-.001	.000
	(.0031)	(.0038)	(.0031)	(.0036)
Total_missions_area	-43.184**	-51.208*	-29.767	-13.783
	(21.5282)	(26.5749)	(19.6526)	(23.0250)
	(.1140)	(.1281)	(.1129)	(.1214)
DWH				
(pvale)		0.000		0.000
Adj. R^2	.555	.558	.556	.557
No. of cases	79690	77952	79690	77952

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This table shows the results of OLS and IV estimation. The dependent variable is the use of water-treatment products. Not all of the controls appear in the table. The controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics within walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.6 – Estimation of the effect of trust on access to an improved source of drinking water

	OLS	IV	OLS	IV
$Trust\_Neigh$	.023	.127**		
	(.0292)	(.0698)		
$Trust\_GVS$			-.003	.353
			(.0727)	(.2361)
EFI	.074	-.008	.074	-.001
	(.0486)	(.2460)	(.0490)	(.2567)
Age_median	-.002	-.004	-.002	-.002
	(.0037)	(.0053)	(.0037)	(.0051)
Quartile 2	-.036	-.031	-.038	-.044
	(.0303)	(.0325)	(.0303)	(.0321)
Quartile 3	-.035	-.021	-.038	-.040
	(.0316)	(.0339)	(.0313)	(.0327)
Quartile 4	-.065*	-.052	-.067*	-.062
	(.0343)	(.0431)	(.0343)	(.0433)
Prop_urban	-.138***	-.109**	-.142***	-.120**
	(.0346)	(.0473)	(.0344)	(.0506)
Attend_meeting	-.018	-.032	-.016	-.015
	(.0303)	(.0349)	(.0302)	(.0340)
Memb_cbo	.030	.016	.035	.012
	(.0682)	(.0708)	(.0682)	(.0708)
Attend_protest	-.119*	-.091	-.125*	-.088
	(.0679)	(.0705)	(.0680)	(.0714)
Attend_rising	.033	.085	.027	.080
	(.1169)	(.1172)	(.1169)	(.1180)
Dist_Recrea_faci	-.019	-.016	-.020	-.012
	(.0271)	(.0271)	(.0272)	(.0277)
Dist_road	.030	.042	.028	.047
	(.0318)	(.0330)	(.0318)	(.0355)
Memb_religious	.030	.029	.031	.038
	(.0361)	(.0361)	(.0361)	(.0369)
Export_area	-.001	-.000	-.002	-.002
	(.0030)	(.0034)	(.0030)	(.0032)
Missions_area	-5.953	.929	-7.106	9.823
	(36.0983)	(35.9751)	(36.1702)	(36.5874)
Constant	.273	.135	.325	.237
	(.2258)	(.3317)	(.2184)	(.2811)
DWH				
(pvale)		0.8272		0.1227
Adj. R^2	.500	.485	.500	.471
No. of cases	476	463	476	463

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This table shows the results of OLS and IV estimation. The dependent variable is access to an improved source of drinking water. Not all of the controls appear in the table. The controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics within walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.7 – OLS estimation of the effect of general trust on health-center quality

	EXP	MES	DABS	LWA	DFE	ILP	PHC
Trust_GVS	.073	.243*	.247**	.391**	.113	-.014	.330**
	(.1246)	(.1382)	(.1227)	(.1262)	(.1159)	(.1077)	(.1181)
EFI	-.104	-.121	.015	-.117	-.111	-.098	-.043
	(.0861)	(.0958)	(.0847)	(.0870)	(.0800)	(.0744)	(.0815)
Wealth_index	.262***	.349***	.113	.116	.195**	.002	.147*
	(.0788)	(.0863)	(.0776)	(.0797)	(.0733)	(.0682)	(.0747)
Median_age	.004	.009**	.004	.007**	.008**	.002	.013***
	(.0032)	(.0035)	(.0032)	(.0033)	(.0030)	(.0028)	(.0031)
Prop_educated	.443***	.069	.290**	.273**	.276**	.060	.164
	(.1167)	(.1293)	(.1149)	(.1182)	(.1086)	(.1009)	(.1106)
Prop_catholic	.100	.035	-.133	.113	.035	-.046	.052
	(.1107)	(.1230)	(.1092)	(.1123)	(.1032)	(.0959)	(.1051)
Prop_proth	-.044	.044	.026	.207	.275*	.218	.072
	(.1746)	(.1922)	(.1718)	(.1765)	(.1627)	(.1509)	(.1654)
Prop_urban	-.048	-.047	-.052	-.126*	-.133**	-.070	-.158**
	(.0636)	(.0705)	(.0628)	(.0645)	(.0593)	(.0551)	(.0604)
Attend_farmer	-.022	.152	-.047	.180	.119	.031	.104
	(.1429)	(.1597)	(.1407)	(.1445)	(.1329)	(.1236)	(.1354)
Attend_protest	.058	.080	.049	.089	.118	.005	-.092
	(.1163)	(.1289)	(.1147)	(.1180)	(.1083)	(.1007)	(.1104)
Attend_rising	-.138	-.587**	-.383**	-.106	-.424**	-.264	-.098
	(.1869)	(.2093)	(.1841)	(.1891)	(.1739)	(.1617)	(.1772)
Attend_meet	-.282	-.694**	-.113	-.298	-.108	.110	-.414*
	(.2358)	(.2627)	(.2322)	(.2385)	(.2194)	(.2039)	(.2235)
Memb_cbo	-.061	-.098	-.064	-.360**	.030	-.154	.016
	(.1430)	(.1589)	(.1407)	(.1447)	(.1331)	(.1236)	(.1355)
Member_farmer	-.200	-.480**	.032	.180	-.514**	-.209	-.106
	(.1766)	(.1950)	(.1740)	(.1793)	(.1644)	(.1528)	(.1675)
Attend_religious	.355**	.398**	.083	.053	.136	.266**	.159
	(.1193)	(.1327)	(.1174)	(.1207)	(.1110)	(.1031)	(.1130)
Attend_meet	.000	.000	.000	.000	.000	.000	.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Prop_male	.063	-.045	-.131	.287	.407	.169	-.110
	(.2601)	(.2963)	(.2627)	(.2708)	(.2481)	(.2307)	(.2529)
Com_bldg_present	.026	-.021	-.025	-.033	-.020	-.008	-.037**
	(.0196)	(.0217)	(.0193)	(.0198)	(.0182)	(.0170)	(.0186)
Dist_school	.007	.080	.046	.078	.042	-.021	.013
	(.0578)	(.0641)	(.0569)	(.0586)	(.0539)	(.0500)	(.0548)
DIst_Health_cl	.135**	-.006	.102**	.143**	-.027	.061	.133**
	(.0522)	(.0577)	(.0514)	(.0528)	(.0485)	(.0451)	(.0494)
Export_area	-.164***	-.138***	-.071*	-.114**	-.122***	-.077**	-.131***
	(.0375)	(.0410)	(.0369)	(.0382)	(.0350)	(.0324)	(.0355)
Missions_area	45.139	142.119	1.313	36.096	54.184	-14.389	76.523
	(81.0851)	(89.6449)	(79.7959)	(82.0226)	(75.3427)	(70.0708)	(76.8103)
Constant	-1.454***	-.587	-.676**	-1.553***	-.846**	-.675**	-.984**
	(.3232)	(.3574)	(.3198)	(.3287)	(.3020)	(.2808)	(.3078)
Adj. R^2	.301	.230	.225	.336	.245	.191	.287
No. of cases	757	755	755	754	754	755	755

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This table shows OLS estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics within walking distance, and district roads, community buildings, recreational facilities and historical variables. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.8 – OLS estimation of the effect of trust in neighbors on health center quality

	EXP	MES	DABS	LWA	DFE	ILP	PHC
	Model 1.1 b/se	Model 1.2 b/se	Model 1.3 b/se	Model 1.4 b/se	Model 1.5 b/se	Model 1.6 b/se	Model 1.7 b/se
Trust_Neigh	.063	.106*	.212***	.153**	.165***	.183***	.246***
	(.0489)	(.0548)	(.0481)	(.0500)	(.0457)	(.0422)	(.0462)
EFI	-.102	-.114	.021	-.103	-.109	-.102	-.034
	(.0858)	(.0956)	(.0836)	(.0868)	(.0792)	(.0733)	(.0802)
Wealth_index	.271***	.355***	.141*	.126	.221**	.037	.177**
	(.0791)	(.0865)	(.0771)	(.0801)	(.0730)	(.0675)	(.0740)
Median_age	.004	.008**	.003	.006*	.008**	.002	.012***
	(.0032)	(.0035)	(.0031)	(.0033)	(.0030)	(.0027)	(.0030)
Prop_educated	.448***	.072	.308**	.275**	.296**	.089	.183*
	(.1166)	(.1293)	(.1137)	(.1183)	(.1077)	(.0996)	(.1091)
Prop_catholic	.105	.051	-.110	.134	.049	-.032	.079
	(.1106)	(.1230)	(.1081)	(.1123)	(.1023)	(.0947)	(.1037)
Prop_Prothestant	-.023	.079	.098	.250	.331**	.290*	.153
	(.1754)	(.1934)	(.1710)	(.1775)	(.1621)	(.1498)	(.1640)
Prop_urban	-.044	-.044	-.035	-.120*	-.118**	-.049	-.140**
	(.0636)	(.0706)	(.0623)	(.0646)	(.0589)	(.0545)	(.0597)
Attend_farmer	-.025	.133	-.056	.159	.117	.039	.091
	(.1425)	(.1593)	(.1390)	(.1443)	(.1315)	(.1218)	(.1333)
Attend_protest	.070	.094	.095	.109	.158	.057	-.042
	(.1167)	(.1295)	(.1141)	(.1186)	(.1080)	(.0999)	(.1094)
Attend_rising	-.141	-.603**	-.390**	-.131	-.421**	-.249	-.110
	(.1863)	(.2088)	(.1818)	(.1888)	(.1721)	(.1593)	(.1745)
Attend_meet	-.273	-.668**	-.081	-.266	-.089	.128	-.375*
	(.2356)	(.2627)	(.2297)	(.2385)	(.2175)	(.2012)	(.2204)
Memb_cbo	-.058	-.083	-.056	-.339**	.032	-.164	.029
	(.1426)	(.1585)	(.1390)	(.1444)	(.1317)	(.1218)	(.1334)
Member_farmer	-.218	-.501**	-.023	.147	-.561***	-.262*	-.167
	(.1770)	(.1954)	(.1726)	(.1799)	(.1636)	(.1512)	(.1656)
Member_religious	.350**	.388**	.065	.034	.125	.257**	.136
	(.1191)	(.1327)	(.1161)	(.1207)	(.1100)	(.1017)	(.1114)
Attend_meet	.000	.000	.000	.000	.000	.000	.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Prop_male	.059	-.071	-.142	.247	.409*	.192	-.129
	(.2594)	(.2955)	(.2594)	(.2702)	(.2455)	(.2272)	(.2489)
Dist_Com_bldg	.027	-.021	-.023	-.033*	-.018	-.004	-.035*
	(.0196)	(.0217)	(.0191)	(.0198)	(.0181)	(.0167)	(.0183)
Dist_school	.009	.081	.053	.079	.049	-.009	.021
	(.0578)	(.0641)	(.0563)	(.0586)	(.0534)	(.0493)	(.0540)
Dist_Health_c	.134**	-.008	.098*	.140**	-.031	.057	.128**
	(.0522)	(.0577)	(.0508)	(.0528)	(.0481)	(.0445)	(.0488)
Export_area	-.151***	-.120**	-.026	-.087**	-.084**	-.032	-.080**
	(.0392)	(.0428)	(.0382)	(.0399)	(.0363)	(.0334)	(.0366)
Missions_area	42.820	138.392	-5.951	29.136	48.910	-19.102	67.814
	(81.0173)	(89.6101)	(78.9583)	(82.0346)	(74.7159)	(69.1669)	(75.7490)
Constant	-1.578***	-.721*	-1.100**	-1.735***	-1.224***	-1.173***	-1.449***
	(.3399)	(.3763)	(.3342)	(.3473)	(.3167)	(.2928)	(.3207)
Adj. R^2	.303	.230	.242	.335	.258	.212	.307
No. of cases	757	755	755	754	754	755	755

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This table shows OLS estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics within walking distance, and district roads, community buildings and recreational facilities and historical variables. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.9 – IV estimation of the effect of generalized trust on health-center quality

	EXP	MES	DABS	LWA	DFE	ILP	PHC
$Trust\_GVS$	.542	1.150**	.170	1.152**	.679*	-.073	1.062**
	(.3819)	(.4282)	(.3829)	(.4044)	(.3818)	(.3245)	(.3827)
EFI	-.038	-.166**	.129*	-.003	-.082	-.045	-.012
	(.0714)	(.0812)	(.0713)	(.0755)	(.0709)	(.0604)	(.0713)
Constant	-1.975***	-1.620***	-.835**	-1.905***	-1.207***	-.826***	-1.555***
	(.2777)	(.3165)	(.2793)	(.2959)	(.2781)	(.2367)	(.2792)
DWH (pvalue)	0.535	0.031	0.718	0.270	0.567	0.234	0.031
Adj. R^2	.277	.161	.199	.250	.163	.182	.186
No. of cases	1017	1012	1014	1013	1013	1014	1014

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This table shows the results of IV estimation. The estimations include country fixed effects. The dependent variables describe the local health-center quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of male, the percentage of persons who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO and religious groups, the distribution of health centers and health clinics within walking distance, the district of road, community building, recreational facilities in the district and historical variables. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.10 – IV estimation of the effect of trust in neighbors on health-center quality

	EXP	MES	DABS	LWA	DFE	ILP	PHC
Dist_NEIGH	.317**	.322**	.227**	.372***	.380***	.324***	.544***
	(.0971)	(.1093)	(.0971)	(.1015)	(.0953)	(.0816)	(.0974)
EFI	-.035	-.157**	.128*	.007	-.079	-.049	-.006
	(.0712)	(.0798)	(.0711)	(.0744)	(.0700)	(.0597)	(.0713)
Constant	-2.372***	-1.775***	-1.222***	-2.167***	-1.686***	-1.511***	-2.206***
	(.2965)	(.3360)	(.3001)	(.3138)	(.2947)	(.2521)	(.3010)
DWH (pvalue)		0.007	0.945	0.203	0.548	0.021	0.020
Adj. R^2	.278	.187	.201	.269	.181	.198	.182
No. of cases	1017	1012	1014	1013	1013	1014	1014

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This table shows the results of IV estimation. The dependent variables describe local health-center quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of persons who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO and religious groups, the distribution of health centers and health clinics within walking distance, the district of road, community building and recreational facilities in the district. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5.11 – IV estimation of the effect of trust in neighbors on health-center quality with historical controls

	EXP	MES	DABS	LWA	DFE	ILP	PHC
Trust_Neigh	.214	.261	.421**	.570**	.482**	.512***	.738***
	(.1773)	(.1869)	(.1617)	(.1749)	(.1614)	(.1486)	(.1619)
EFI	.831*	.142	.443	.343	.580	.422	.375
	(.4596)	(.4777)	(.4253)	(.4580)	(.4242)	(.3908)	(.4260)
Wealth_index	.178	.337**	.097	.097	.167*	.004	.188*
	(.1085)	(.1116)	(.0996)	(.1072)	(.0989)	(.0915)	(.0998)
Median_age	.009**	.009**	.006*	.009**	.013**	.004	.014***
	(.0042)	(.0043)	(.0039)	(.0042)	(.0039)	(.0036)	(.0039)
Prop_educated	.713***	.151	.397**	.483**	.512**	.280*	.344**
	(.1772)	(.1828)	(.1644)	(.1763)	(.1645)	(.1510)	(.1647)
Prop_catholic	.112	.059	-.086	.178	.074	-.007	.138
	(.1221)	(.1296)	(.1134)	(.1222)	(.1126)	(.1042)	(.1136)
Prop_prothestant	.024	.165	.209	.469**	.351*	.356**	.385**
	(.2059)	(.2160)	(.1898)	(.2045)	(.1884)	(.1744)	(.1901)
Prop_urban	-.155*	-.062	-.044	-.163*	-.152*	-.082	-.147*
	(.0874)	(.0923)	(.0808)	(.0869)	(.0803)	(.0742)	(.0809)
Attend_farmer	-.061	.122	-.009	.128	.171	.061	.139
	(.1560)	(.1647)	(.1441)	(.1553)	(.1431)	(.1324)	(.1444)
Attend_protest	.226	.185	.203	.201	.296**	.170	.120
	(.1398)	(.1466)	(.1304)	(.1415)	(.1301)	(.1199)	(.1307)
Attend_rising	-.102	-.585**	-.295	-.106	-.330*	-.195	-.008
	(.2048)	(.2181)	(.1892)	(.2037)	(.1882)	(.1738)	(.1895)
Attend_meet	-.174	-.629**	-.039	-.084	-.112	.112	-.372
	(.2591)	(.2740)	(.2391)	(.2575)	(.2379)	(.2197)	(.2395)
Memb_cbo	-.059	-.143	-.209	-.383**	.018	-.164	-.058
	(.1562)	(.1642)	(.1441)	(.1555)	(.1434)	(.1324)	(.1444)
Member_farmer	-.378*	-.536**	-.053	.037	-.775***	-.421**	-.345*
	(.2103)	(.2167)	(.1930)	(.2101)	(.1930)	(.1774)	(.1934)
Member_religious	.260*	.344**	-.025	-.065	.021	.166	.046
	(.1359)	(.1421)	(.1255)	(.1357)	(.1246)	(.1153)	(.1257)
Attend_meet	.000	.000	.000	.000	.000	.000	.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Prop_male	.071	-.151	-.262	.151	.386	.134	-.205
	(.2887)	(.3124)	(.2741)	(.2967)	(.2722)	(.2519)	(.2746)
Com_bldg_present	.037*	-.017	-.016	-.013	-.002	.004	-.022
	(.0217)	(.0227)	(.0200)	(.0215)	(.0198)	(.0184)	(.0200)
Dist_school	-.012	.083	.061	.107	.051	-.013	.052
	(.0654)	(.0696)	(.0603)	(.0652)	(.0600)	(.0554)	(.0604)
Dist_Health_cli	.114*	-.020	.084	.111*	-.066	.040	.111**
	(.0588)	(.0616)	(.0542)	(.0584)	(.0539)	(.0498)	(.0543)
Export_area	-.061	-.073	.041	.037	.044	.091	.057
	(.0726)	(.0740)	(.0669)	(.0731)	(.0677)	(.0615)	(.0670)
Missions_area	-42.473	116.636	-68.587	-34.191	-24.091	-76.203	8.347
	(94.8699)	(99.1522)	(87.5125)	(94.1123)	(87.0618)	(80.4163)	(87.6666)
Constant	-2.389***	-1.124*	-1.836**	-3.030***	-2.376***	-2.171***	-2.792***
	(.6137)	(.6396)	(.5750)	(.6234)	(.5763)	(.5284)	(.5760)
DWH (pvalue)	996	0.997	0.0849	0.853	0.998	0.996	0.908
Adj. R^2	.165	.198	.194	.247	.144	.093	.192
No. of cases	710	708	708	707	707	708	708

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This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to local health-center quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO

TABLE 5.12 – IV estimation of the effect of general trust on health-center quality with historical variables

	EXP	MES	DABS	LWA	DFE	ILP	PHC
$Trust\_GVS$	-.563	.464	-.074	.607	-.038	-.307	.341
	(.5232)	(.5351)	(.4769)	(.4928)	(.4685)	(.4347)	(.4546)
EFI	.870*	.130	.452	.325	.576	.443	.371
	(.4731)	(.4889)	(.4310)	(.4452)	(.4239)	(.3929)	(.4109)
Wealth_index	.110	.315**	.015	.019	.077	-.106	.067
	(.1137)	(.1178)	(.1037)	(.1072)	(.1019)	(.0945)	(.0989)
Median_age	.009**	.010**	.007*	.010**	.013***	.005	.015***
	(.0042)	(.0043)	(.0039)	(.0040)	(.0038)	(.0035)	(.0037)
Prop_educated	.651***	.133	.326**	.429**	.425**	.181	.246*
	(.1712)	(.1729)	(.1561)	(.1609)	(.1535)	(.1423)	(.1488)
Prop_catholic	.099	.024	-.126	.120	.031	-.055	.064
	(.1226)	(.1274)	(.1120)	(.1158)	(.1098)	(.1021)	(.1067)
Prop_prot	-.074	.081	.058	.294	.190	.163	.139
	(.2043)	(.2086)	(.1861)	(.1923)	(.1834)	(.1697)	(.1775)
Prop_urban	-.190**	-.068	-.084	-.196**	-.193**	-.137*	-.203**
	(.0927)	(.0973)	(.0843)	(.0871)	(.0830)	(.0769)	(.0804)
Attend_farmer	-.119	.155	-.046	.132	.134	-.002	.110
	(.1622)	(.1703)	(.1477)	(.1528)	(.1449)	(.1347)	(.1408)
Attend_protest	.150	.150	.097	.093	.175	.030	-.040
	(.1345)	(.1388)	(.1228)	(.1275)	(.1204)	(.1119)	(.1171)
Attend_rising	-.173	-.580**	-.354*	-.131	-.397**	-.284	-.076
	(.2085)	(.2187)	(.1899)	(.1960)	(.1862)	(.1731)	(.1811)
Attend_meet	-.128	-.648**	-.004	-.078	-.067	.167	-.338
	(.2629)	(.2746)	(.2398)	(.2476)	(.2352)	(.2186)	(.2286)
Memb_cbo	-.021	-.169	-.196	-.408**	.025	-.136	-.062
	(.1610)	(.1679)	(.1466)	(.1513)	(.1440)	(.1336)	(.1397)
Member_farmer	-.274	-.484**	.090	.197	-.606***	-.234	-.118
	(.2001)	(.2066)	(.1823)	(.1898)	(.1790)	(.1662)	(.1738)
Member_religious	.257*	.368**	-.000	-.011	.048	.191*	.103
	(.1382)	(.1416)	(.1259)	(.1301)	(.1234)	(.1148)	(.1201)
Attend_meet	.000	.000	.000	.000	.000	.000	.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Prop_male	-.025	-.081	-.307	.215	.345	.039	-.198
	(.3028)	(.3292)	(.2861)	(.2983)	(.2806)	(.2608)	(.2728)
Dist_Com_bldg	.032	-.018	-.021	-.016	-.007	-.003	-.028
	(.0220)	(.0227)	(.0200)	(.0207)	(.0196)	(.0182)	(.0191)
Dist_school	-.036	.075	.033	.082	.024	-.051	.011
	(.0670)	(.0713)	(.0610)	(.0632)	(.0602)	(.0556)	(.0582)
Dist_Health_c	.117**	-.016	.090*	.119**	-.058	.047	.121**
	(.0592)	(.0615)	(.0540)	(.0557)	(.0529)	(.0492)	(.0514)
Export_area	-.135**	-.121**	-.069	-.086*	-.083*	-.050	-.117**
	(.0532)	(.0536)	(.0484)	(.0506)	(.0477)	(.0441)	(.0462)
Missions_area	-41.423	129.123	-54.948	-8.533	-6.429	-61.977	37.443
	(95.9901)	(99.3362)	(87.4726)	(90.4161)	(85.8289)	(79.7330)	(83.3952)
Constant	-1.552***	-.729	-.715*	-1.901***	-1.107**	-.687*	-1.088**
	(.4569)	(.4673)	(.4200)	(.4359)	(.4117)	(.3828)	(.4004)
DWH (pvalue)	0.997	0.987	0.136	0.223	0.995	0.997	0.800
Adj. R^2	.148	.202	.198	.311	.170	.112	.271
No. of cases	710	708	708	707	707	708	708

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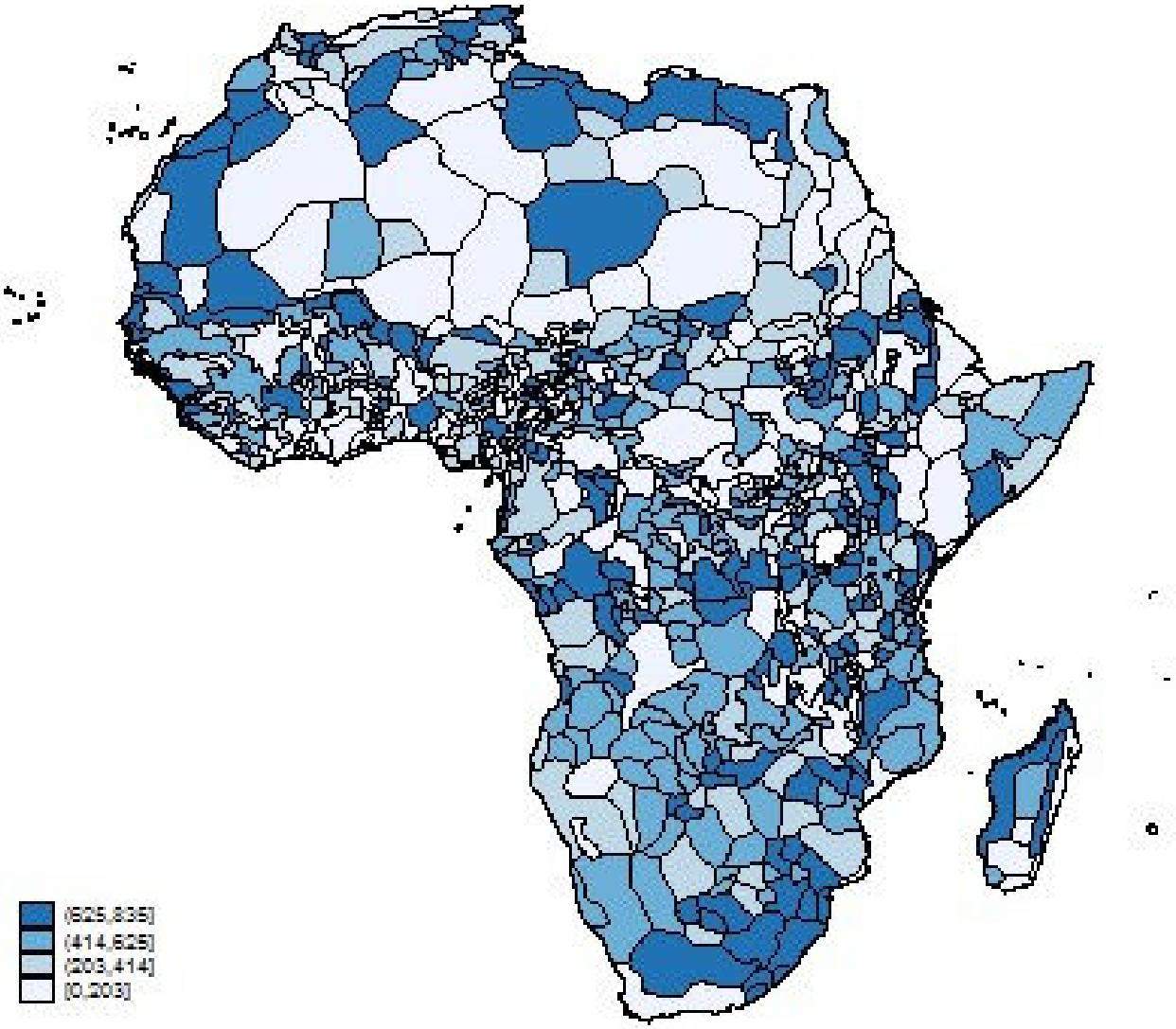
This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to local health-center quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christians and Protestants, the proportion of membership in CBO

FIGURE 5.1 – Historical territories of ethnic groups



Chapitre 6

What drives school quality in Africa ? Disentangling social capital and ethnic divisions

6.1. Introduction

African communities are often faced with limited governmental resources. These communities rely on collective action to provide basic public goods, often with the help of non-governmental organizations. Schools are no exception. Communities typically purchase textbooks, school furniture, teaching and learning materials, and maintain school buildings. At the extreme, communities receive no governmental support and have full control over the supply of elementary education (see for example Miller-Grandvaux & Yoder (2002)). While such community schools have their pros and cons, a consensus has emerged that they should be encouraged as an effective way of providing basic education in Africa. Many national and international programs have been implemented to increase participation by local communities (see Yamada (2013)). As a result, in Africa more than anywhere else in the world, school quality depends critically on the community's ability to engage in collective action.

It is therefore important to understand the ability of African communities to engage in collective action and improve school quality. Two stylized facts have emerged. Existing analysis, at both the local and country level, has underlined a number of different determinants. Community-level analysis has found that trust among community members, frequency of social contact and shared norms are important determinants of school quality (Yamada (2013), Miguel & Gugerty (2005), Glennerster *et al.* (2013)). These social-relations characteristics are often referred to as social capital (Putnam (2000)) and recognized as key determinants of collective action (Ostrom (1990)). By way of contrast, country-level analysis, following the influential work of Easterly & Levine (1997), focuses on the ethnic

divisions that are an important feature of social life in Africa : Green (2012) notes that more than 177 ethnic groups, representing 43 percent of the African population, were split across two and sometimes three colonial borders. More heterogeneous countries in this respect suffer from worse economic performance and lower levels of public goods (Alesina *et al.* (2003) ; Easterly & Levine (1997) ; Alesina & La Ferrara (2000) ; Haddad & Maluccio (2003)). Ethnic divisions likely play a role in schools, since for instance the language in which classes will be taught is at stake. Determining which of social capital and ethnic divisions is the main driver of school quality in Africa is not straightforward. First, the relationship between the social capital and the quality of public goods are mutually reinforcing in a reciprocal configuration. We face here problems of reverse causality (e.g. a well-functioning community may increase trust among its members : see Durlauf & Fafchamps (2005) for a discussion). Second, ethnic fractionalization is certainly not random and the systematic sorting of individuals from particular place, or with certain unobserved tastes for public goods, into more or less diverse areas could potentially introduce omitted variables bias into cross-sectional estimates of the impact of diversity on quality of school (see Glennerster *et al.* (2013)). The policy required to improve school quality differs according to which factor is the most important. If it is ethnic divisions then separatism can be suggested (i.e. physically separating ethnic groups) (Muller 2008). If social capital is rather the key driver, then its reinforcement at the local level is to be encouraged.

We here use data from the Afrobarometer to test the role of social capital and ethnic divisions in determining school quality. Following a now well-established tradition (see Algan & Cahuc (2013) for a survey), we proxy social capital by the average level of trust. We measure ethnic divisions by the index of ethnic fractionalization proposed by Alesina

et al. (2003). We circumvent the reverse causality problems between trust and the quality of public goods by appealing to inherited trust. In Africa a large part of values and social norms (i.e. the main ingredients of social capital) are transmitted along ethnic lines (Horowitz (1985)). Using historical information on the settlement patterns of ethnic groups in Sub-Saharan Africa, we calculate two measures of inherited trust : trust in close neighbors and generalized trust. To deal with the potential problem of omitted bias do to the endogenous sorting of individuals, we use the initial population density of historical homeland of ethnic groups which is negatively linked to the level of ethnic fractionalization.

In line with previous findings (Nunn & Wantchekon (2011), Algan & Cahuc (2010) and Uslaner (2008a)), we find that trust is indeed to a large part inherited. We therefore use inherited levels of trust along ethnic lines as an instrument. We find trust have a *causal* impact on the community's ability to increase school quality. A rise of one standard deviation in the level of trust increases school quality by .17 to .39 standard deviations, depending on the measure of school quality under consideration. Once we control for trust, ethnic fragmentation plays only a marginal role. In contrast to the country-level findings, we therefore do not find that ethnic fragmentation has an impact on school quality. We also appeal to a set of other controls to see whether a selection effect is at work. We find that unobservables are unlikely to be driving our results in various model specifications. Last, we carry out a number of robustness checks, in all of which our key results persist.

The remainder of the paper is organized as follows. Section 2 provides a review of the literature regarding trust and public-good quality. The historical background justifying the use of inherited trust is described in Section 3, and Section 4 describes the survey data and the variable definitions. The econometric specification and controls are set out in Section

5, and the results appear in Section 6. Last, Section 7 concludes.

6.2. Trust, ethnicity and the local management of public goods : a literature review

Any attempt to establish causal links between cultural values, like social capital or trust, and economic outcomes (e.g. education) is confronted with at least three major challenges. We address these three by appealing to recent work in cultural economics.

The first challenge is that concepts such as "trust" or "social capital" are not unambiguously defined, and are hard to capture quantitatively. Social capital is a broadly-defined notion which is certainly helpful for thinking about what connects individuals within a community. The well-known work of Putnam (2000) and Coleman (1990) discusses social capital in a convincing manner to explain the dynamics of societies. Its use has now spread out beyond the world of academia. NGOs and governments, as well as popular discourse, now regularly refer to social capital to explain many aspects of social life. Economists have typically been rather reluctant to use a notion that is so loosely defined and hard to measure (Joel (2002)). However, the emerging field of cultural economics has been successful in providing quantitative evidence showing that inherited values do explain some current important economic outcomes. Much attention has been devoted to one particular aspect of social capital, namely trust. Trust, as measured in survey questions, is only a proxy for social capital but certainly captures some key aspects of interpersonal relationships. As Uslaner (2008a) notes, "*trust is a value that leads to many positive outcomes for a society-greater tolerance of minorities, greater levels of volunteering and giving to charity,*

better functioning government, less corruption, more open markets, and greater economic growth." Following common practice, we measure trust using the so-called generalized trust question : "*Generally speaking, would you say That most people can be trusted, or That you can not be too careful in dealing with people ?*". Respondents reply either "*Most people can be trusted* " or "*Can not be too careful dealing with people*". The percentage of respondents who agreed that most people can be trusted is a proxy for social capital. Since we here focus on local social interactions, we also use an alternative measure of trust at the local level. The precise wording is "*How much do you trust each of the following types of people : Your neighbors ?*".[1] Respondents choose between four possible answers : (i) not at all, (ii) just a little, (iii) somewhat, or (iv) a lot. This allows us to create a proxy for social capital that is specific to a local area.

Second, until recently cross-country data were not available in Africa.[2] The Afrobarometer (www.afrobarometer.org) offers reliable cross-country data collected via individual interviews. This data allows us to calculate trust in more than 1000 districts, covering 18 sub-Saharan countries and almost 500 million inhabitants. The Afrobarometer also offers seven criteria of school quality.[3] In addition, we use the Murdock (1967) ethnographic atlas that allows us to locate the area in which each ethnicity was historically located. Combining these two allows us to estimate "inherited trust" along ethnic lines.

The last challenge is establishing causality, rather than simple correlations. We face two kind of problems. First, we face a problems of reverse causality (e.g. a well-functioning

1. The formulation of this question is due to its also being used to elicit trust regarding other social groups such as "*your own ethnic group*".

2. Surveys like the European Values Survey started in the early 1980's, while the first waves of the Afrobarometer appeared in 2001 and 2005

3. These criteria are : services are too expensive, lack of textbooks or other supplies, poor teaching, absent teachers, overcrowded classes, poor facilities, and illegal payments.

community may increase trust among its members : see Durlauf & Fafchamps (2005) for a discussion) and second, ethnic fractionalization is certainly not a random accident and may be caused in part by an endogenous residential sorting.

The most efficient strategy to avoid these endogeneity concerns is to consider two instruments : a form of inherited trust for trust and the initial population density for ethnic division.

Our strategy is to use instrumental variables (IV). We create a variable which is specific to the ethnic group, called "inherited trust" and the initial population density of the locality. To do so, we use data on stable, historically-determined, patterns of ethnic land settlement available in Murdock (1967). We assume that individuals' levels of trust are inherited along ethnic lines, in the spirit of Nunn & Wantchekon (2011) who considered the impact of the slave trade on contemporaneous levels of trust in Africa. Inherited trust can be assumed to affect current trust, but not directly our variables of interest, namely those regarding school quality. Inherited trust is thus an appropriate instrumental variable. Our first empirical strategy is similar to those found in Uslaner (2008b), Guiso *et al.* (2007), Tabellini (2008) and Algan & Cahuc (2010).

6.3. Data and variable definitions

Our analysis is based on the third round of the Afrobarometer (2008). The Afrobarometer consists of a nationally-representative sample of primary sampling units (PSUs) selected with a probability proportional to population size (a minimum of 1200). We here use data from 16 countries : Benin, Botswana, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, South Africa, Tanzania, Uganda and

Zambia [4]. Data are available at the district level, which is the smallest administrative level within a country. Data are available for more than 1335 districts in Africa. The surveys were face-to-face in the respondent's language of choice. The third round of the Afrobarometer survey collected information on some individual-level indicators of social capital, livelihoods, and perception of democracy. Descriptive statistics for the socio-economic variables in this sample appear in Table 2.

Information on historical settlement patterns are drawn from the Murdock Ethnographic Atlas. Murdock (1967) compiled the work from many ethnographic analyses into one database and classified 1,167 societies around the world according to their culture and institutions. This database contains information on pre-colonial conditions and characteristics of many ethnic groups and tribes within Africa. Additional information on the ethnic groups' historical homelands and actual locations are drawn from the seminal paper of Nunn & Wantchekon (2011) on the impact of the slave trade on mistrust in Africa.

School-quality indicators are derived from the Afrobarometer, which contains seven questions about district school quality. Individuals were asked : "*Have you encountered any of these problems with your local public school during the past 12 months*" : 1. *Services are too expensive or Unable to pay ?* ; 2. *Lack of textbooks or other supplies ?* ; 3. *Poor teaching ?* ; 4. *Absent teacher ?* ; 5. *Overcrowded classrooms* ; 6. *Poor conditions of facilities ?* ; and 7. *Demands for illegal payments ?*. These school-quality indicators allow us to distinguish between inefficient schools and those which work normally. For instance, it is possible that some schools score pretty high on each dimension but noneless provide little knowledge. It is not uncommon in Africa that after a number of years of schooling pupils

4. Zimbabwe is excluded in the sample because the general trust question is not asked, Cape Verde is excluded because ethnic groups there could not be identified

still lack the most basic knowledge. Compared to indicators which examine school outputs via standardized tests, the indicators here concern the necessary conditions for learning to take place.

To measure trust, two variables are used : generalized trust and trust in neighbors. The first is measured using the General Value Survey (GVS) trust question : "*Generally speaking, would you say That most people can be trusted, or That you can not be too careful in dealing with people ?*". Respondents reply either "*Most people can be trusted* " or "*Can not be too careful dealing with people*". District trust is thus measured by the percentage of respondents stating that "*Most people can be trusted*". This is by far the most common trust measure in empirical work, and is often presented as a proxy for social capital. However, generalized trust has been the subject of a long debate in the literature. A number of researchers have argued that these trust questions are too abstract (Glaeser *et al.* (2000), Nannestad (2008), and Sturgis & Smith (2010)) and are not good measures of trust. Despite these problems, Tabellini (2008) has argued that the GVS question is an indicator of moral values that is transmitted from one generation to another. As such, it is an indicator of a culture of general morality through which distant history influences current institutional outcomes. The second variable is trust in neighbors. The exact wording of the question is are : "*How much do you trust each of the following types of people : Your neighbors ?*". Respondents choose between four possible answers : (i) not at all, (ii) just a little, (iii) somewhat, or (iv) a lot.

6.4. Identification Strategy

The objective here is to to determine the causal link between trust and the quality of district public goods. To this end, we estimate the following

$$\omega_{c,d} = \pi_0 + \pi_1 Trust_{c,d} + \pi_2 EFI_{c,d} + \pi_3 X_{c,d} + \varepsilon_{c,d} \tag{6.1}$$

Here $\omega_{c,d}$ is the school-quality indicator which is : schools being too expensive (EXP), a lack of textbooks or other supplies (BSP), poor teaching (PTE), teachers being absent (TABS), a problem of overcrowded classes (OWC), poor facilities (PFAC), and problems with illegal payments (ILP). The vector $X_{c,d}$ picks up district-level characteristics, and $Trust_{c,d}$ is district-level trust. The two trust measures, generalized trust ($Trust_{GVS}$) and trust in close neighbors ($Trust_{neigh}$), will be considered separately. The variable $EFI_{c,d}$ is the ethnic fractionization index, defined as $1 - \sum_{e=1}^{N} s^2$ (where s is the district share of the ethnic group). The ethnic fractionization index measures the probability that two randomly-selected individuals be from a different ethnic group (Easterly & Levine (1997)). Last, $\varepsilon_{c,d}$ is the error term, and the π_i are the coefficients.

6.5. OLS estimation results : Trust and school quality

We first estimate equation 6.1 without any controls : the results appear in Table 3. In the first part of the table we regress school quality on generalized trust and the ethnic fractionalization index, and in the second we replace generalized trust with trust in neighbors. The estimated trust coefficients are positive and significant for six of the se-

ven school-quality indicators. However, trust in neighbors is more strongly correlated with our dependent variable, and is more significant. We then control for a range of district characteristics in table 4 for generalized trust and 5 for trust in neighbors (see Table 2 for the descriptive statistics of these controls). Trust remains an important determinant of school quality : that in neighbors is now significant for all seven school-quality measures. None of the controls plays such an important role. The controls that are the most significantly correlated with school quality are participation in religious groups, farming organizations or professional and business associations. Participation in local religious or farming organizations is positively correlated with many of the school-quality variables. On the contrary, the correlation with participation in business associations is negative. Social groups are considered as places in which social capital is created, supporting the idea that social capital is an important driver of school quality. EFI, which picks up ethnic fractionalization, plays only a marginal role compared to the other variables. The introduction of our controls here has only a limited effect on the estimated coefficients on both trust and EFI. However, as discussed in Section 2, trust, school quality and EFI are correlated. To deal with possible reverse causality, we use an instrumental variable (IV) strategy in the next section. For instance, better schools may produce more social capital, and limit the impact of ethnic fractionalization.

6.6. The IV specification

To implement IV, we need an instrument which satisfies two conditions : it must be relevant, in that it is correlated with the endogenous variable, and it must be exogenous, so that it affects trust only via the instrumented variable, without any independent or auto-

nomous role. The instrument that we consider here is inherited trust, which is particular to an ethnic group and is likely to have been shaped over a long period, before modern states were established. A number of recent pieces of work have provided evidence suggesting that inherited trust is a key determinant of current economic outcomes ((Guiso *et al.*, 2007), Tabellini (2008), Algan & Cahuc (2010)). Uslaner (2008b) has shown that a large part of current individual trust can be explained by the trust of their ancestors' place of birth. Using similar data to ours, Nunn & Wantchekon (2011) show that current trust levels are rooted in long-term history, and in particularly the slave trade. Applying the same logic here, individuals' inherited trust can be inferred from the trust in their historical ethnic origins. This inherited trust from their ethnic groups will serve as instrument for their current trust. Ethnic division is instrumented by the initial population densities of ethnic territories in colonial period. We hypothesis that large and heterogeneous cities was created in low densities territories. This follows Green (2012) who shows that low population densities led colonialists to create large states, thereby leading to higher levels of ethnic diversity within Africa. Our IV equation can then be specified as :

$$\omega_{c,d} = \pi_0 + \pi_1 Trust_{c,d} + \pi_2 EFI_{c,d} + \pi_3 X_{c,d} + \varepsilon_{c,d} \tag{6.2}$$

$$Trust_{c,d} = \rho_0 + \rho_1 Inherit_{c,d} + \rho_3 X_{c,d} + \varepsilon_{c,d} \tag{6.3}$$

where $Inherit_{trust}$ is inherited trust in the district, and the other variables are the same as those defined in Section 6.4. Before analyzing the IV results, we describe the construction of the instrument and the first-stage regressions

6.6.1. Instrument construction and the first-stage regressions

Inherited trust is calculated using historical information on ethnic groups' settlement patterns in Africa. This information is from Murdock's Ethnographic Atlas, which described pre-colonial ethnic conditions. We use this atlas to map out the territory of many African ethnic groups before the formation of modern countries. In this way 282 historical ethnic territories can be delimited, as depicted in Figure 6.1.

This information on historical ethnic boundaries from Murdock (1967) allows us to identify different ethnicities' homelands. The main difficulty is, however, that some ethnic groups are dislocated into different sub-groups, while others have completely changed their names. However, we can obtain information in this respect from Nunn & Wantchekon (2011) (available at http ://scholar.harvard.edu/nunn/pages/data-0). This allows us to link current ethnic groups to those identified by Murdock (1967). We find that 48 percent of respondents still live in the homeland of their ethnicity. We calculate inherited trust from the ethnic homeland from the average trust level of those who still live there. Each respondent is then an inherited-trust score equal to the average trust in their ethnic homeland. District-level inherited trust is average respondent inherited trust weighted by the relative size of each ethnic group in the districts.

Table 6 shows the results from OLS estimation of equation (3). As expected, inherited trust is strongly correlated with current trust levels, both for GVS and trust in neighbors. Thus, a one standard deviation increase in inherited GVS trust leads to a 0.414 standard deviation increases in predicted district generalized trust. This correlation is even stronger for trust in neighbors, with an analogous figure of .563. We find also that the initial ethnic territories densities are negatively correlated with ethnic fractionalization. The coefficient

is highly significant. For three trust measures, the models suggest no problems of weak instruments. The F-statistics are greater than 10. The partial correlations between inherited trust and district current trust appear in Figure 2.

6.6.2. IV results

Before interpreting the estimation results, we first consider the results from the Durbin-Wu-Hausman test. The relevant p-values appear at the bottom of tables 10 and 9. Apart from BSP and ILP, the test statistics reveal that we cannot reject the null hypothesis that the OLS estimation of generalized trust is consistent. Regarding trust in neighbors, the test statistics suggest an endogeneity problem in the estimation of the coefficients of three variables (BSP, ILP and PTE), and reject the null hypothesis that the OLS estimator is consistent. The IV estimates are therefore preferable.

The results of IV estimation appear in Tables 10 and 9 respectively for generalized trust and trust in neighbors. IV estimation confirms the positive and significant effect of trust on school quality. The estimated trust effect is large and suggests that districts with higher levels of generalized trust and trust in neighbors perform with respect to school management. The coefficients from IV estimation are considerably larger than those in the OLS estimates.

The estimated effects of generalized trust and trust in neighbors are substantial in size. All else equal, a one percent increase in generalized trust reduces the problem of book supply in schools by 1.14 percent, the problems of book supply by 0.96 percent, the problem of illegal payments by 0.62 percent, and the problem of poor teaching in the district by 1.03 percent. We do not find any causal relationship between generalized trust and problems

of expenses : the significant coefficient on generalized trust in school expenses problems in OLS estimation disappears in the IV specification. The effect of generalized trust on teacher absenteeism is insignificant.

The IV estimation results of the level of trust on the quality of school services can be found in Table 10. The general results here are very similar to the OLS estimates, except for the estimation of teacher absenteeism. We find that districts with greater trust in neighbors have in general better quality schools. The effect of trust in neighbors is larger than that of generalized trust. Six of the seven indicators of school quality are causally significantly linked to trust in neighbors. As shown in the first column of Table 10, the effect of trust in neighbors is large in size. A rise of only one percent reduces the problem of school expenses by .19 percent, with figures of 0.44 and 0.315 percent for problems with book supply and overcrowded schools.

These results are consistent with the differences in the ability of communities to manage local public goods depending critically on their levels of trust. Districts where individuals declare greater trust in their neighbors are more willing to deal with a number of problems in schools, and there are fewer problems of book supply, overcrowded classrooms, illegal payments, and poor teaching and facilities. To a lesser extent, we find that generalized trust also helps to explain district school quality. This positive effect of trust seems larger than the negative effect of ethnic fractionalization, which is often considered as the most important determinant of public-good provision in Africa.

TABLE 6.1 – Altonji's ratio

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust_{GVS}$ ratio	-2.59	-2.94	-13.20	-8.13	-4.86	3.16	-3.19
$Trust_{neigh}$ ratio	-2.10	-1.88	-2.50	-4.22	-3.62	18.21	-2.19

6.7. Robustness checks

We run a series of robustness checks. We first consider whether our controls in the OLS estimations are relevant, using the method proposed by Altonji *et al.* (2005). We follow Altonji *et al.* (2005), who calculate the size of the omitted variable which would make our results invalid. This method allows us to calculate how large the unobservable should be relative to the observable in order for our results to only be produced by a problem of selection. To see how this method works, consider two types of regressions : one with a restricted set of controls and another with a full set of controls. Let the estimated coefficient of the restricted regression be π^W and that from the regression with full controls π^C. We then calculate the ratio : $\pi^C/(\pi^W - \pi^C)$. The intuition behind this ratio, as described by Nunn & Wantchekon (2011), Satyanath *et al.* (2013) is as follows. The intuition behind this ratio is the following. The larger is π^C, the stronger is the effect that is left after controlling for observables and the more would unobservables have to explain in order to reduce the coefficient to zero. The larger is the difference between π^W and π^C, the larger is the estimated coefficient influenced by observables and the stronger would the selection of unobservables have to be relatively to the selection of observables to explain away the entire effect.

In table 6.1, we report the different ratio calculated for the different measures of trust namely generalized trust (in the first part of table) and the level of trust in neighbors (in the bottom of table). The beta coefficient of the regression without controls is represented in the first column and the regression with full controls is presented in the second column of the tables while the ratio obtained can be read in the last columns. The negative value of the ratio indicates that observables are on average negatively correlated with the outcome variables, suggesting a downward bias for our OLS estimates due to unobservables. Our entire ratio is greater than one in absolute value. Therefore, the covariance between the unobserved characteristics and the school quality with the must exceed the covariance between our selection of controls to explain away the entire effect. However, a rule of thumbs announced by Nunn & Wantchekon (2011) requires that a ratio three is acceptable for proving that the OLS estimate found is not fully driven by selection on unobservables. Only five of the fourteen estimations are below of three. For all others estimations, the ratio calculated are greater than three and this make us confident that the effect found in the OLS estimations are not only driven by unobserved heterogeneities.

The exclusion restriction is that the inherited trust affect actual level of trust only through internal factors e.g beliefs and values inherited from their ethnic group. The condition is not valid if inherited trust affect the school quality through other sources namely local institutions. In tables 14 we report the results of the estimation of the IV equation using districts where respondents living outsides of their ethnic groups' homelands are majorities. The results suggest that the effect of trust found do change slightly although that the coefficients are more important. In particular, the effect of trust in neighbors remains strong. This results confirms first that our results are strong and second this insure us that

the fully effect of the inherited trust is done through current level of trust.

We introduce historical variables in tables 12 and 13. The controls are the former presence of colonisers, railways and the presence of a pre-colonial city, the deadliness of the disease environment and a measure of the historic exposure of the territory to the transatlantic and Indian Ocean slave trade. With the inclusion of these additional controls, the effect of generalized trust becomes weaker while trust in neighbors is still significant.

The final strategy consist in using alternatives measures of the dependant variables. For this purpose, we normalize the indicators of the quality of schools. This should allows us to have more comparable measures of the quality of schools. In the table 15 we can note that the effect of trust in the quality of schools do not change at all.

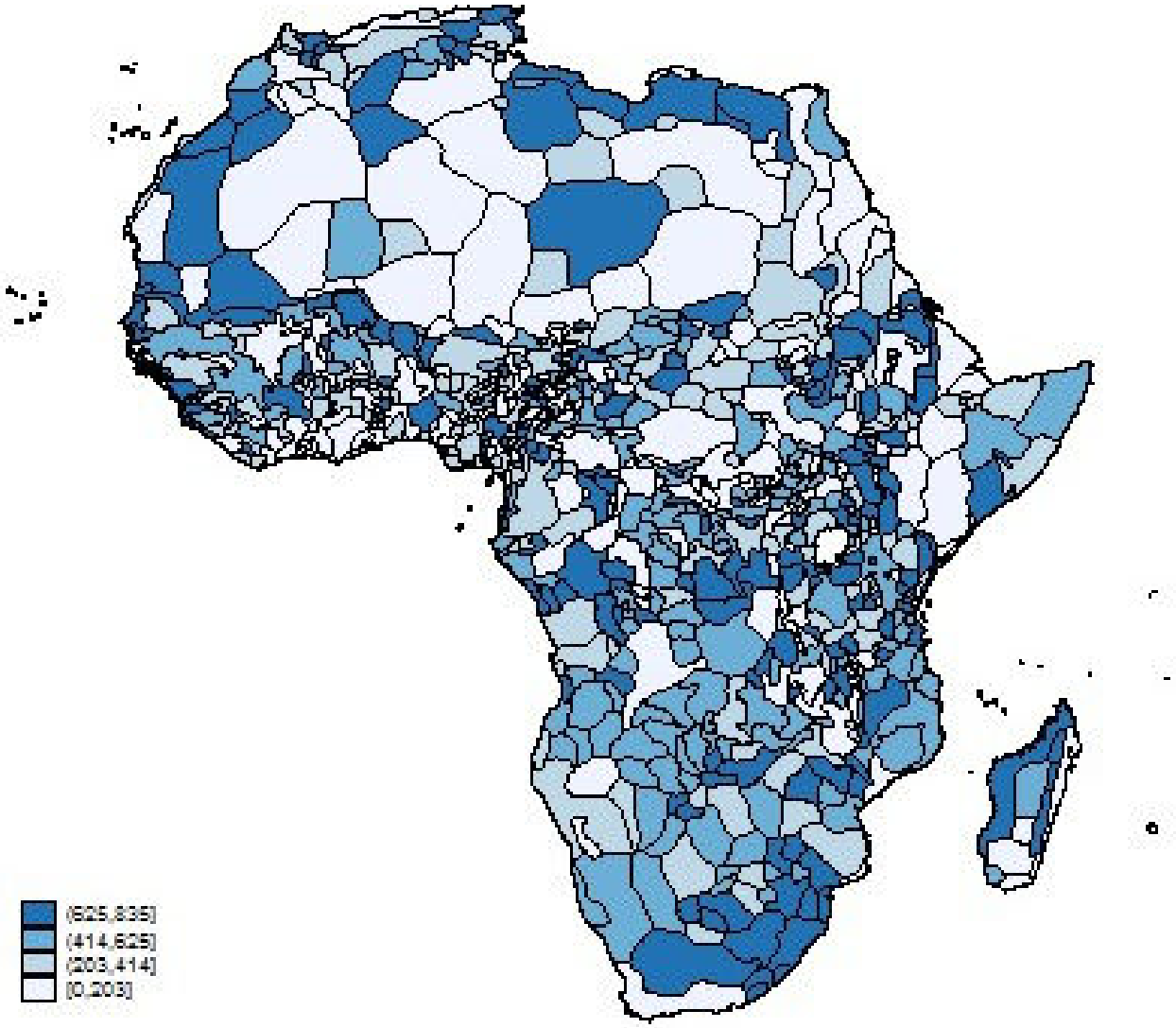
6.8. Conclusion

The purpose of this paper was to study the determinants of collective at the local level. In particular, we wish to highlight the importance of social capital to promote better schools in Africa. We identify social capital as a key aspect of the ability to undertake collective action.

Following a now well establish tradition, we proxy social capital by the average level of trust. To circumvent endogeneity problems caused by the co-variation of trust and the local governance, we constructed inherited trust variables. Using information on the historical settlement patterns of ethnic groups in Sub-Saharan Africa, two measures of inherited trust are considered : trust in close neighbors and generalized trust. Trust inherited by individuals living in a district is strongly related to that find in their ethnic homeland. Trust is to a large part inherited along the ethnic lines. In line with previous findings

Algan & Cahuc (2010) and Uslaner (2008a), we find that social capital builds in the long run. As a consequence, we can use inherited levels of trust as an instrument. Both trust in neighbors and generalized trust successfully passed a battery of tests and robustness checks aiming at establishing a causal relationship. We can thus claim that trust has a *causal* impact on the ability of a community to increase the quality of schools in their district. An interesting finding is that once trust is controlled for, ethnic fragmentation does only play a marginal role. In contrast to country-level findings, our results support the view that ethnic fragmentation has only a limited impact on the ability to produce local public good such as schools.

FIGURE 6.1 – Historical territories of ethnic groups



Appendices

FIGURE 2 – Partial correlations between inherited and actual trust

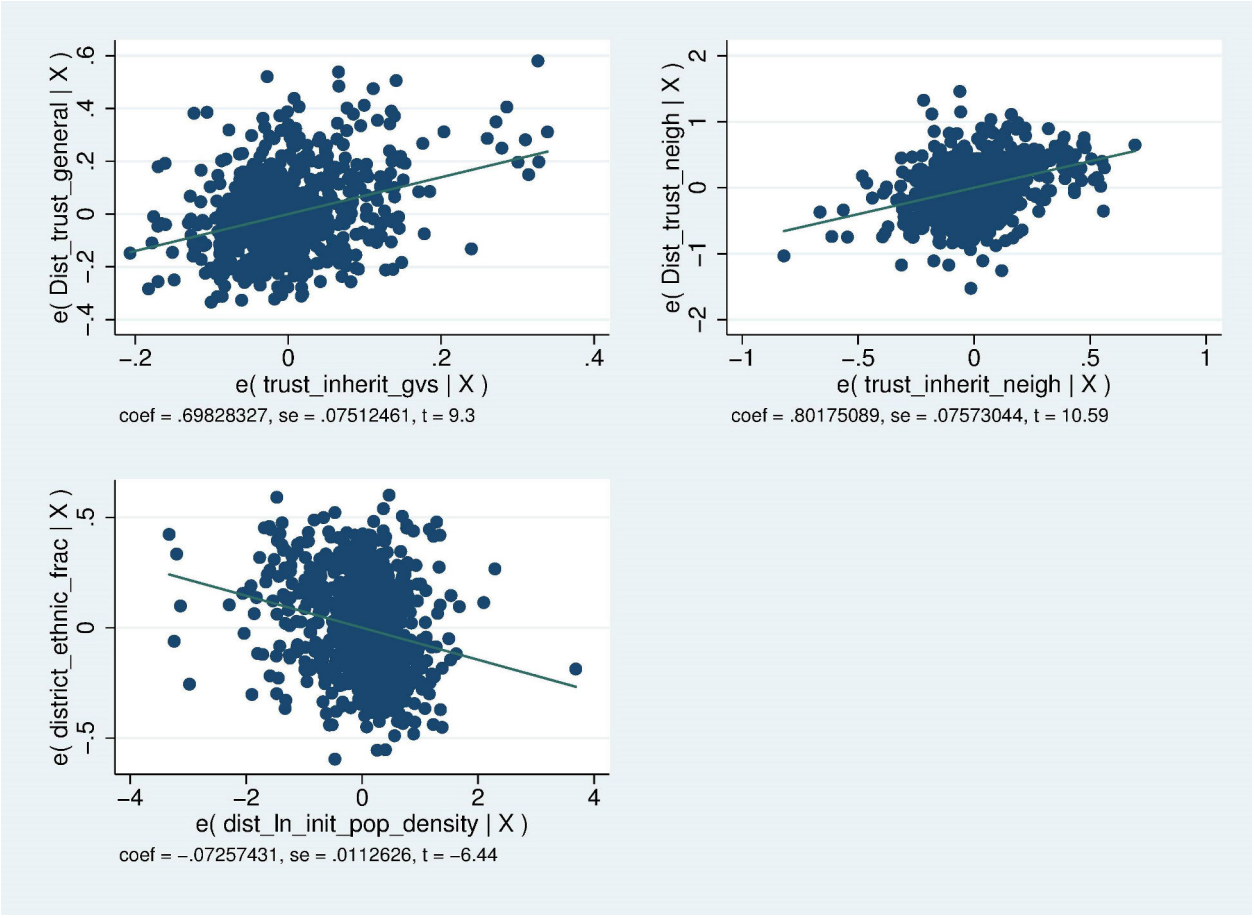


TABLE 2 – Summary Statistics

Variable		Mean	Std. Dev.	N
	School Quality			
PTE	Poor teaching	1.006	0.680	1331
ILP	Illegal Payment	0.560	0.563	1332
PFAC	Poor facilities	1.197	0.748	1333
OWC	Overcrowd Classrooms	1.345	0.752	1331
TABS	Teacher absenteeism	1.002	0.643	1332
BSP	Book supply	1.118	0.693	1334
EXP	School too expensive	0.845	0.652	1334
	District Level of Trust			
$Trust_{GVS}$	Level of generalized trust	0.185	0.183	1327
$Trust_{neigh}$	Level of trust in neighbors	1.744	0.563	1263
	District-level characteristics			
EFI	District Level of ethnic fractionalization	0.313	0.279	1181
Dist_wealth	District level wealth index	0.014	0.429	1355
Median_age	Age median	34.785	7.971	1291
Prop_male	Proportion male	0.493	0.117	1292
Prop_educated	Proportion educated	0.643	0.317	1355
Prop_catholic	Proportion Catholic	0.217	0.225	1292
Prop_protestant	Proportion Protestant	0.123	0.177	1292
Prop_rural	Proportion in an urban area	0.31	0.421	1292
Pay-bribe	Proportion who paid bribes	0.049	0.481	1355
Memb_farmer	Proportion in farming group	0.284	0.201	1355
Atten_protest	Proportion in protest	0.503	0.224	1355
Atten_rising	Proportion raise issues	0.831	0.174	1355
Atten_meet	Proportion attending meetings	0.898	0.139	1355
Memb_cbo	Proportion of member of CBO	0.328	0.211	1355
Memb_profes	Proportion in professional group	0.199	0.164	1355
Memb_religious	Proportion in religious group	0.756	0.212	1355
Dist_com_bldg	Distribution of community buildings	0.727	1.586	1355
Dist_school	Distribution of schools	0.817	0.387	1169
Dist_Health_clinic	Distribution of health clinics	0.49	0.435	1264
Dist_Road	Distribution of roads	0.366	0.43	1355
Dist_recrea_fa	Distribution of facilities	0.555	0.435	1333

TABLE 3 – OLS estimates of the effect of trust on school quality

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_GVS$	.123	.218*	.185*	.437***	.262**	.331***	.203*
	(.1021)	(.1122)	(.1063)	(.1267)	(.1216)	(.0925)	(.1100)
EFI	.090	.022	.044	-.116	-.031	.068	-.043
	(.0669)	(.0735)	(.0695)	(.0830)	(.0797)	(.0606)	(.0721)
Constant	-1.386***	-1.518***	-1.302***	-1.900***	-1.567***	-.995***	-1.546***
	(.0739)	(.0812)	(.0767)	(.0915)	(.0880)	(.0669)	(.0795)
Adj. R^2	.207	.145	.147	.128	.190	.215	.211
No. Obs	1069	1069	1068	1066	1068	1068	1067
T_{neigh}	.042	.078**	.074**	.135**	.150***	.217***	.095**
	(.0357)	(.0393)	(.0371)	(.0445)	(.0424)	(.0319)	(.0384)
EFI	.089	.022	.045	-.114	-.026	.082	-.039
	(.0671)	(.0736)	(.0696)	(.0832)	(.0795)	(.0598)	(.0722)
Constant	-1.418***	-1.581***	-1.367***	-1.991***	-1.735***	-1.252***	-1.641***
	(.0894)	(.0981)	(.0928)	(.1110)	(.1059)	(.0797)	(.0961)
Adj. R^2	.207	.144	.147	.126	.197	.238	.212
No. Obs	1068	1068	1067	1065	1067	1067	1066

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Standard errors are in parentheses. All regressions are OLS with country fixed effects. The dependent variables refer to district school quality. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 4 – OLS estimates of the effect of generalized trust on school quality

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
Trust_GVS	.183*	.310**	.166	.470***	.270**	.233**	.225**
	(.1065)	(.1159)	(.1111)	(.1328)	(.1275)	(.0953)	(.1139)
EFI	.050	-.111	-.020	-.206**	-.160*	.114*	-.109
	(.0735)	(.0800)	(.0766)	(.0917)	(.0882)	(.0658)	(.0787)
Dist_wealth	.114*	.209**	.057	.094	.169**	-.034	.016
	(.0674)	(.0733)	(.0705)	(.0844)	(.0808)	(.0603)	(.0722)
Median_age	-.002	.004	.000	.004	.002	.002	.006**
	(.0028)	(.0030)	(.0029)	(.0035)	(.0033)	(.0025)	(.0030)
Prop_educated	.051	-.021	.048	-.041	-.074	.087	.032
	(.0979)	(.1065)	(.1020)	(.1220)	(.1173)	(.0880)	(.1048)
Prop_catholic	-.043	.099	.047	.068	.034	-.215**	.225**
	(.0971)	(.1056)	(.1011)	(.1209)	(.1163)	(.0871)	(.1038)
Prop_protestant	-.201	.161	.072	.311*	.194	-.241*	.256*
	(.1381)	(.1503)	(.1438)	(.1719)	(.1654)	(.1236)	(.1477)
Prop_urban	.009	.035	.086	.157**	.052	-.052	.094
	(.0545)	(.0593)	(.0568)	(.0679)	(.0653)	(.0487)	(.0583)
Memb_farmer	.031	.177	.185	.588***	.374**	.013	.115
	(.1255)	(.1366)	(.1307)	(.1562)	(.1503)	(.1124)	(.1342)
Attent_protest	.053	-.050	-.187*	-.088	-.049	-.191**	-.160
	(.1009)	(.1098)	(.1051)	(.1257)	(.1209)	(.0904)	(.1079)
Join_rising	-.215	-.397**	-.271	-.254	-.392**	-.100	-.322*
	(.1622)	(.1765)	(.1689)	(.2020)	(.1943)	(.1453)	(.1735)
Attent_meeting	-.309	-.362*	.056	-.292	-.151	-.201	.073
	(.1988)	(.2163)	(.2073)	(.2489)	(.2381)	(.1778)	(.2132)
Memb_cbo	.068	-.131	-.162	-.282*	-.361**	.010	-.228*
	(.1213)	(.1320)	(.1264)	(.1511)	(.1453)	(.1085)	(.1297)
Memb_profess	-.207	-.327**	-.297*	-.397**	-.074	-.196	-.209
	(.1530)	(.1664)	(.1593)	(.1905)	(.1832)	(.1368)	(.1636)
Memb_religious	.448***	.443***	.230**	.240*	.002	.289**	.259**
	(.1074)	(.1168)	(.1121)	(.1344)	(.1288)	(.0961)	(.1157)
Prop_male	.653**	.308	-.530**	-.022	-.028	-.267	-.411*
	(.2205)	(.2399)	(.2296)	(.2744)	(.2641)	(.1972)	(.2357)
Dist_Com_bldg	.012	.005	-.006	-.020	-.004	-.014	.009
	(.0144)	(.0157)	(.0150)	(.0179)	(.0173)	(.0129)	(.0154)
Dist_paybribe	-.037	-.024	-.111**	-.182**	-.081	.076*	-.069
	(.0449)	(.0489)	(.0469)	(.0567)	(.0538)	(.0402)	(.0480)
Dist_School	.081	.050	.102*	.037	.016	-.018	.121**
	(.0513)	(.0558)	(.0535)	(.0639)	(.0614)	(.0459)	(.0549)
Dist_Clinic	-.009	.021	.025	-.067	.023	-.010	-.035
	(.0472)	(.0513)	(.0491)	(.0588)	(.0566)	(.0422)	(.0505)
Dist_Road	-.072	.012	-.072	-.096	-.002	-.069	-.015
	(.0511)	(.0555)	(.0531)	(.0635)	(.0611)	(.0457)	(.0546)
Dist_recrea_faci	-.009	-.103**	-.081*	-.014	-.041	.009	-.054
	(.0462)	(.0503)	(.0481)	(.0576)	(.0554)	(.0413)	(.0494)
Constant	-1.566***	-1.351***	-.966***	-1.708***	-1.064***	-.551**	-1.551***
	(.2336)	(.2542)	(.2432)	(.2908)	(.2799)	(.2090)	(.2501)
Adj. R^2	.232	.189	.176	.161	.210	.245	.249
No. of cases	1028	1028	1027	1025	1027	1027	1026

All regressions are OLS with country fixed effects. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 5 – OLS estimation of the effect of trust in neighbors on school quality

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
Trust_neigh	.071*	.155***	.113**	.173***	.202***	.206***	.163***
	(.0396)	(.0429)	(.0411)	(.0496)	(.0470)	(.0349)	(.0421)
EFI	.052	-.111	-.021	-.204**	-.160*	.112*	-.110
	(.0735)	(.0798)	(.0764)	(.0917)	(.0876)	(.0649)	(.0783)
Dist_wealth	.113*	.227**	.073	.104	.195**	.004	.045
	(.0685)	(.0744)	(.0715)	(.0859)	(.0816)	(.0605)	(.0731)
Median_age	-.002	.004	.000	.003	.002	.002	.006**
	(.0028)	(.0030)	(.0029)	(.0035)	(.0033)	(.0024)	(.0029)
Prop_educated	.071	.013	.074	-.005	-.022	.133	.067
	(.0986)	(.1070)	(.1025)	(.1228)	(.1173)	(.0874)	(.1050)
Prop_catholic	-.021	.144	.081	.116	.099	-.150*	.274**
	(.0980)	(.1064)	(.1018)	(.1221)	(.1166)	(.0867)	(.1043)
Prop_protestant	-.163	.254*	.146	.402**	.330*	-.098	.365**
	(.1413)	(.1534)	(.1469)	(.1760)	(.1681)	(.1248)	(.1503)
Prop_urban	.014	.044	.092	.169**	.063	-.042	.102*
	(.0545)	(.0592)	(.0567)	(.0679)	(.0648)	(.0481)	(.0580)
Memb_farmer	.017	.156	.171	.558***	.350**	-.008	.098
	(.1254)	(.1362)	(.1303)	(.1562)	(.1492)	(.1108)	(.1334)
Attent_protest	.055	-.034	-.172	-.077	-.023	-.157*	-.135
	(.1013)	(.1099)	(.1052)	(.1262)	(.1205)	(.0895)	(.1077)
Attent_rising	-.206	-.401**	-.271	-.253	-.383**	-.106	-.330*
	(.1629)	(.1768)	(.1693)	(.2029)	(.1938)	(.1439)	(.1734)
Attent_meet	-.285	-.334	.072	-.254	-.122	-.186	.090
	(.1988)	(.2157)	(.2068)	(.2490)	(.2364)	(.1754)	(.2122)
Memb_cbo	.082	-.109	-.150	-.249*	-.340**	.027	-.212
	(.1211)	(.1314)	(.1259)	(.1509)	(.1441)	(.1069)	(.1289)
Memb_profes	-.217	-.363**	-.327**	-.425**	-.126	-.257*	-.256
	(.1536)	(.1667)	(.1596)	(.1913)	(.1827)	(.1355)	(.1635)
Memb_religious	.442***	.437***	.228**	.231*	-.003	.289**	.258**
	(.1074)	(.1165)	(.1118)	(.1344)	(.1279)	(.0947)	(.1151)
Prop_male	.668**	.279	-.543**	-.041	-.030	-.310	-.450*
	(.2239)	(.2431)	(.2327)	(.2788)	(.2664)	(.1976)	(.2382)
Dist_Combldg	.013	.007	-.004	-.017	-.001	-.011	.011
	(.0144)	(.0157)	(.0150)	(.0180)	(.0172)	(.0127)	(.0153)
Pay-bribe	-.034	-.017	-.106**	-.171**	-.072	.085**	-.062
	(.0449)	(.0488)	(.0469)	(.0568)	(.0534)	(.0397)	(.0478)
Dist_school	.083	.056	.107**	.041	.025	-.007	.129**
	(.0513)	(.0557)	(.0534)	(.0640)	(.0611)	(.0453)	(.0546)
Dist_clinic	-.003	.023	.025	-.059	.025	-.013	-.037
	(.0474)	(.0514)	(.0493)	(.0591)	(.0565)	(.0418)	(.0505)
Dist_road	-.073	.012	-.069	-.100	.005	-.060	-.010
	(.0510)	(.0553)	(.0529)	(.0635)	(.0606)	(.0450)	(.0542)
Dist_Recrea_fa	-.018	-.116**	-.089*	-.033	-.055	-.002	-.063
	(.0462)	(.0501)	(.0480)	(.0576)	(.0550)	(.0407)	(.0491)
Constant	-1.670***	-1.539***	-1.130***	-1.892***	-1.389***	-.851***	-1.773***
	(.2453)	(.2662)	(.2548)	(.3056)	(.2919)	(.2165)	(.2614)
Adj. R^2	.232	.192	.178	.159	.220	.266	.255
No. of cases	1027	1027	1026	1024	1026	1026	1025

All regressions are OLS with country fixed effects. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 6 – First-stage regressions

	$trust_{GVS}$		$trust_{neigh}$		EFI	
	b	se	b	se	b	se
Inherit_GVS	.6983***	(.0751)				
Beta_coef	.414***					
Inherit_NEIGH			.8018***	(.0757)		
Beta_coef		.563***				
Ln_init_pop_dens					-.0726***	(.0113)
Beta_coef			-.375***			
EFI	.0249	(.0238)	.0506	(.0593)		
Dist_wealth	-.0489**	(.0224)	-.1430**	(.0559)	.1711***	(.0350)
Median_age	-.0011	(.0009)	.0044*	(.0023)	-.0050***	(.0014)
Prop_educated	-.0677**	(.0336)	-.1041	(.0842)	-.2347***	(.0509)
Prop_catholic	.0102	(.0318)	-.1038	(.0795)	-.0521	(.0494)
Attend_prothes	-.0414	(.0489)	-.2430**	(.1236)	.1333*	(.0757)
Prop_urban	-.0031	(.0181)	-.0572	(.0451)	.0927***	(.0280)
Memb_farmer	-.0442	(.0394)	.1416	(.0981)	-.0511	(.0614)
Attend_protest	-.0326	(.0332)	-.1270	(.0830)	-.0891*	(.0518)
Attend_rising	-.1141**	(.0536)	.0443	(.1332)	-.0850	(.0824)
Attend_meet	.1135*	(.0665)	-.0718	(.1657)	.0114	(.1043)
Memb_cbo	.0328	(.0406)	-.1769*	(.1016)	.0128	(.0633)
Memb_profes	.0426	(.0499)	.3184**	(.1244)	.1067	(.0779)
Memb_religious	.0013	(.0342)	.0376	(.0852)	.0744	(.0530)
Prop_male	-.2669***	(.0790)	.0375	(.1974)	-.0370	(.1311)
Com_bldg	-.0041	(.0056)	-.0156	(.0140)	.0046	(.0086)
Dist_paybribe	-.0130	(.0144)	.0668*	(.0359)	-.0087	(.0222)
Dist_school	-.0113	(.0161)	-.0187	(.0401)	.0240	(.0247)
Dist_Health	.0068	(.0154)	-.0045	(.0383)	.0510**	(.0236)
Dist_Road	-.0301*	(.0166)	-.0406	(.0415)	-.0228	(.0256)
Dist_Recrea_f	-.0136	(.0149)	.0535	(.0371)	-.0559**	(.0229)
loc_exports	-.0000	(.0000)	.0000	(.0001)	-.0000	(.0001)
Total_missions	-5.2051	(21.8723)	-34.5166	(54.6689)	100.7161**	(34.2240)
Cities_1400	-.0163	(.0238)	.0572	(.0602)	-.0026	(.0368)
Dist_Saharan_line	.0003	(.0002)	.0004	(.0006)	-.0017***	(.0004)
Dist_Saharan_node	-.0004	(.0002)	-.0004	(.0006)	.0017***	(.0004)
Railway_contact	-.0271	(.0166)	-.0401	(.0410)	.0195	(.0259)
Malaria_ecology	-.0008	(.0016)	-.0039	(.0041)	.0077**	(.0025)
Constant	.3747***	(.0955)	.2567	(.2885)	.5972***	(.1457)
F Stat	86.40		112.08		41.52	
Adj. R^2	.368		.542		.360	
No. of cases	766		766		739	

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The dependent variables are generalized trust in the first column and trust in neighbors in the second. All regressions are OLS with country fixed effects. Standard errors are in parentheses. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 7 – OLS estimation controlling for historical variables

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_GVS$	.136	.276**	.228*	.536***	.289*	.257**	.303**
	(.1226)	(.1366)	(.1297)	(.1587)	(.1505)	(.1144)	(.1356)
EFI	.048	-.095	-.051	-.242**	-.233**	.087	-.156*
	(.0834)	(.0929)	(.0879)	(.1079)	(.1025)	(.0778)	(.0923)
Slave_exports	-.000***	-.001***	-.000	-.000	-.000	-.000**	-.000**
	(.0001)	(.0001)	(.0001)	(.0002)	(.0002)	(.0001)	(.0001)
Total_missions	-17.642	73.313	155.357*	-57.969	39.083	16.379	185.160**
	(75.7099)	(84.3455)	(79.8501)	(97.7071)	(92.8705)	(70.6346)	(83.6001)
Cities_1400_dum	.214**	.150	.120	.046	.134	.271***	.036
	(.0827)	(.0921)	(.0871)	(.1066)	(.1014)	(.0771)	(.0913)
Dist_Saharan_l	-.001	-.000	.001	-.000	-.000	-.000	-.001
	(.0009)	(.0009)	(.0009)	(.0011)	(.0010)	(.0008)	(.0009)
Dist_Saharan_n	.000	-.000	-.001	.000	.000	.000	.001
	(.0008)	(.0009)	(.0009)	(.0011)	(.0010)	(.0008)	(.0009)
Railway_contact	.065	.098	.157**	.175**	.171**	.096*	.126**
	(.0566)	(.0631)	(.0597)	(.0730)	(.0695)	(.0528)	(.0625)
Malaria_ecology	-.000	.003	.002	-.001	-.008	.003	-.003
	(.0056)	(.0063)	(.0059)	(.0072)	(.0069)	(.0052)	(.0062)
Constant	-1.167***	-.581	-.971**	-1.592***	-.745*	-.491	-1.501***
	(.3288)	(.3663)	(.3465)	(.4242)	(.4033)	(.3067)	(.3639)
Adj. R^2	.271	.246	.219	.184	.272	.266	.262
No. of cases	763	763	762	760	762	763	761

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This table shows OLS estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 8 – OLS estimation controlling for historical variables

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_NEIGH$	.000	.105*	.093*	.224***	.208***	.195***	.194***
	(.0480)	(.0534)	(.0506)	(.0625)	(.0585)	(.0443)	(.0527)
EFI	.053	-.091	-.049	-.234**	-.236**	.083	-.157*
	(.0834)	(.0928)	(.0878)	(.1076)	(.1018)	(.0770)	(.0917)
Slave_exports	-.000***	-.001***	-.000	-.000	-.000	-.000*	-.000
	(.0001)	(.0001)	(.0001)	(.0002)	(.0002)	(.0001)	(.0001)
Total_missions	-21.034	79.144	160.854**	-43.084	57.235	33.789	201.076**
	(75.9394)	(84.5443)	(80.0139)	(97.8622)	(92.5003)	(70.0963)	(83.2910)
Cities_1400_dum	.212**	.129	.102	.000	.096	.236**	.001
	(.0830)	(.0925)	(.0874)	(.1069)	(.1012)	(.0767)	(.0911)
Dist_Saharan_l	-.000	-.000	.001	-.000	-.000	-.000	-.001
	(.0009)	(.0009)	(.0009)	(.0011)	(.0010)	(.0008)	(.0009)
Dist_Saharan_n	.000	-.000	-.001	.000	.000	.000	.001
	(.0008)	(.0009)	(.0009)	(.0011)	(.0010)	(.0008)	(.0009)
Railway_contact	.059	.093	.154**	.167**	.174**	.099*	.127**
	(.0565)	(.0629)	(.0595)	(.0727)	(.0688)	(.0522)	(.0620)
Malaria_ecology	-.000	.003	.002	-.001	-.008	.003	-.002
	(.0056)	(.0063)	(.0059)	(.0072)	(.0068)	(.0052)	(.0062)
Constant	-1.082**	-.666*	-1.057**	-1.801***	-1.079**	-.813**	-1.792***
	(.3413)	(.3799)	(.3593)	(.4392)	(.4157)	(.3150)	(.3754)
Adj. R^2	.270	.246	.219	.185	.281	.280	.270
No. of cases	763	763	762	760	762	763	761

.

This table shows OLS estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 9 – IV estimation of the effect of generalized trust on school quality

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_GVS$	.415	1.182**	.038	.963**	.075	.622*	1.029**
	(.3645)	(.4076)	(.3806)	(.4585)	(.4350)	(.3269)	(.3965)
EFI	.056	-.103	.002	-.198**	-.142	.123*	-.087
	(.0735)	(.0822)	(.0761)	(.0919)	(.0878)	(.0663)	(.0799)
Constant	-1.914***	-2.166***	-1.221***	-2.482***	-1.506***	-1.070***	-2.216***
	(.2405)	(.2690)	(.2489)	(.2995)	(.2869)	(.2160)	(.2612)
DWH (pvalue)	0.535	0.031	0.718	0.270	0.567	0.234	0.031
Adj. R^2	.221	.130	.163	.135	.201	.221	.204
No. obs	1011	1011	1010	1008	1010	1010	1009

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This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 10 – IV estimation of the effect of trust in neighbors on school quality

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_NEIGH$	.197**	.437***	.129	.315**	.283**	.393***	.388***
	(.0978)	(.1080)	(.1007)	(.1204)	(.1154)	(.0873)	(.1042)
EFI	.053	-.106	-.003	-.196**	-.152*	.115*	-.089
	(.0736)	(.0813)	(.0758)	(.0916)	(.0870)	(.0657)	(.0785)
Constant	-2.055***	-2.380***	-1.404***	-2.601***	-1.912***	-1.434***	-2.416***
	(.2464)	(.2720)	(.2531)	(.3059)	(.2910)	(.2199)	(.2626)
DWH (pvalue)	0.170	0.007	0.945	0.203	0.548	0.021	0.020
Adj. R^2	.217	.148	.170	.139	.214	.234	.230
No. obs	1011	1011	1010	1008	1010	1010	1009

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This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 11 – IV estimations with normalized values

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_GVS$	.138	.389**	.013	.330**	.035	.186*	.362**
	(.1199)	(.1334)	(.1251)	(.1505)	(.1431)	(.1073)	(.1312)
Constant	.431***	.425***	.674***	.285**	.611***	.758***	.334**
	(.0953)	(.1060)	(.0988)	(.1189)	(.1137)	(.0854)	(.1043)
Adj. R^2	.229	.148	.174	.146	.209	.234	.207
No. of cases	1011	1011	1010	1008	1010	1010	1009
$Trust\_neigh$	.059*	.130***	.035	.089**	.078**	.121***	.126***
	(.0321)	(.0351)	(.0331)	(.0393)	(.0379)	(.0285)	(.0342)
Constant	.388***	.365***	.617***	.274**	.485***	.623***	.270**
	(.0976)	(.1068)	(.1005)	(.1202)	(.1156)	(.0868)	(.1043)
Adj. R^2	.227	.173	.179	.154	.220	.249	.240
No. of cases	1011	1011	1010	1008	1010	1010	1009

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This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 12 – IV estimation controlling for historical variables

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_GVS$	-.229	.828*	-.287	.866	.105	.079*	.635
	(.4498)	(.4573)	(.4381)	(.5268)	(.4858)	(.3950)	(.4580)
EFI	1.228**	.039	.312	-.036	-.419	.765**	.380
	(.3932)	(.3997)	(.3763)	(.4501)	(.4221)	(.3453)	(.3953)
Slave_exports	-.000**	-.001***	-.000*	-.000	-.000*	-.000*	-.000
	(.0001)	(.0002)	(.0001)	(.0002)	(.0002)	(.0001)	(.0001)
Total_missions	-117.894	76.922	122.650	-64.225	24.725	-26.189	168.606*
	(86.9087)	(88.3618)	(83.4900)	(100.2640)	(93.7416)	(76.3341)	(87.6943)
Cities_1400_dum	.274**	.163*	.122	.034	.090	.298***	.071
	(.0933)	(.0949)	(.0891)	(.1071)	(.1006)	(.0820)	(.0942)
Dist_Saharan_l	.001	.000	.002	-.000	-.000	.001	-.000
	(.0010)	(.0011)	(.0010)	(.0012)	(.0011)	(.0009)	(.0010)
Dist_Saharan_n	-.001	-.000	-.001	.001	.000	-.001	.000
	(.0010)	(.0010)	(.0010)	(.0012)	(.0011)	(.0009)	(.0010)
Railway_contact	-.032	.090	.116	.198**	.152*	.039	.075
	(.0743)	(.0756)	(.0715)	(.0860)	(.0802)	(.0653)	(.0751)
Malaria_ecology	-.007	.003	.000	-.004	-.009	-.002	-.005
	(.0071)	(.0072)	(.0068)	(.0082)	(.0077)	(.0062)	(.0072)
Constant	-1.483**	-.951**	-.985**	-2.005***	-.803*	-.541	-1.975***
	(.4526)	(.4602)	(.4341)	(.5224)	(.4884)	(.3975)	(.4602)
Adj. R^2	.071	.214	.184	.186	.280	.184	.218
No. of cases	721	721	720	718	720	721	719

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This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 13 – IV estimation controlling for historical variables

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
	Model 2.1	Model 2.2	Model 2.3	Model 2.4	Model 2.5	Model 2.6	Model 2.7
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Trust_NEIGH	.017	.258*	.077	.376**	.307**	.267**	.415**
	(.1335)	(.1358)	(.1272)	(.1510)	(.1442)	(.1166)	(.1352)
EFI	1.211**	.075	.285	-.007	-.438	.747**	.388
	(.3814)	(.3880)	(.3625)	(.4392)	(.4101)	(.3332)	(.3838)
Slave_exports	-.000**	-.000**	-.000	-.000	-.000	-.000	-.000
	(.0002)	(.0002)	(.0002)	(.0002)	(.0002)	(.0001)	(.0002)
Total_missions	-108.971	82.956	141.318*	-43.633	58.369	3.455	199.106**
	(86.2547)	(87.7537)	(82.2186)	(100.0850)	(93.1641)	(75.3432)	(87.1605)
Cities_1400_dum	.273**	.119	.114	-.028	.046	.260**	.007
	(.0950)	(.0967)	(.0903)	(.1098)	(.1026)	(.0830)	(.0960)
Dist_Saharan_l	.001	.000	.002	-.000	-.000	.001	-.000
	(.0010)	(.0010)	(.0010)	(.0012)	(.0011)	(.0009)	(.0010)
Dist_Saharan_n	-.001	-.000	-.001	.000	.000	-.001	.000
	(.0010)	(.0010)	(.0009)	(.0012)	(.0011)	(.0009)	(.0010)
Railway_contact	-.018	.060	.138**	.171**	.165**	.052	.066
	(.0680)	(.0692)	(.0647)	(.0787)	(.0734)	(.0594)	(.0687)
Malaria_ecology	-.007	.002	.001	-.004	-.007	-.001	-.004
	(.0069)	(.0070)	(.0066)	(.0080)	(.0075)	(.0061)	(.0070)
Constant	-1.659**	-1.084**	-1.339**	-2.384***	-1.480**	-1.137**	-2.603***
	(.5081)	(.5169)	(.4831)	(.5778)	(.5481)	(.4438)	(.5156)
Adj. R^2	.080	.220	.201	.183	.285	.201	.224
No. of cases	721	721	720	718	720	721	719

.

This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 14 – IV estimation of the effect of generalized trust by sub-sample

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Inherit\_GVS$	-.016	.605**	.027	.684**	.167	.202	.585**
	(.2392)	(.2584)	(.2535)	(.3069)	(.2911)	(.2104)	(.2543)
Constant	-1.562***	-1.635***	-1.035***	-2.025***	-1.409***	-.860***	-1.793***
	(.2278)	(.2461)	(.2414)	(.2925)	(.2774)	(.2006)	(.2424)
Adj. R^2	.267	.226	.162	.133	.213	.215	.242
$Inherit_NEIGH$	.061	.249**	.071	.199*	.183*	.210**	.254**
	(.0884)	(.0955)	(.0936)	(.1136)	(.1075)	(.0774)	(.0939)
Constant	-1.679***	-1.937***	-1.160***	-2.216***	-1.703***	-1.193***	-2.108***
	(.2729)	(.2947)	(.2893)	(.3508)	(.3318)	(.2392)	(.2900)
Adj. R^2	.268	.227	.163	.131	.216	.221	.244
No. of cases	521	521	520	518	520	521	519

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This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 15 – IV estimations with normalized values

	EXP	BSP	TABS	OWC	PFAC	ILP	PTE
$Trust\_GVS$	.138	.389**	.013	.330**	.035	.186*	.362**
	(.1199)	(.1334)	(.1251)	(.1505)	(.1431)	(.1073)	(.1312)
Constant	.431***	.425***	.674***	.285**	.611***	.758***	.334**
	(.0953)	(.1060)	(.0988)	(.1189)	(.1137)	(.0854)	(.1043)
Adj. R^2	.229	.148	.174	.146	.209	.234	.207
No. of cases	1011	1011	1010	1008	1010	1010	1009
$Trust_{neigh}$	.059*	.130***	.035	.089**	.078**	.121***	.126***
	(.0321)	(.0351)	(.0331)	(.0393)	(.0379)	(.0285)	(.0342)
Constant	.388***	.365***	.617***	.274**	.485***	.623***	.270**
	(.0976)	(.1068)	(.1005)	(.1202)	(.1156)	(.0868)	(.1043)
Adj. R^2	.227	.173	.179	.154	.220	.249	.240
No. of cases	1011	1011	1010	1008	1010	1010	1009

.

This table shows IV estimation results. The regressions include country fixed effects. The dependent variables refer to district school quality. Standard errors are in parentheses. The district-level controls are median age, economic conditions, the proportion of members with formal education, the proportion of individuals living in an urban area, the proportion of men, the percentage of people who paid bribes in the districts, the proportions of Christian and Protestant, the proportion of membership in CBO and religious groups, the distribution of schools and health clinics in walking distance, and district roads, community buildings and recreational facilities. * Significant at 90%, ** Significant at 95% and *** Significant at 99%.

TABLE 16 – Factor analysis economic condition and quality of public goods

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Uniqueness
Present Living Cond.	-0.0258	0.0608	0.3966	-0.1567	0.3569	0.0136	0.6862
Living vs other	-0.0556	0.0920	0.2815	-0.0922	0.3504	-0.0058	0.7779
Past Country living Cond	-0.0608	0.1376	0.6580	-0.0335	-0.0339	-0.0038	0.5421
Own living Cond	-0.0384	0.0949	0.7036	-0.0427	0.0893	-0.0011	0.4846
Future country lv Cond	-0.0483	0.7956	0.0886	-0.0277	-0.0200	-0.0031	0.3556
Pas Living cond	-0.0123	0.7912	0.0705	-0.0329	0.0482	0.0038	0.3655
EXP	0.3695	-0.0934	-0.1070	0.5091	-0.0659	0.0129	0.5796
BSP	0.5604	-0.0798	-0.0820	0.4824	-0.0385	-0.0030	0.4386
TABS	0.7626	-0.0312	-0.0416	0.1066	-0.0297	-0.1450	0.3825
PTE	0.7486	-0.0301	-0.0135	0.0494	-0.0056	-0.1310	0.4188
OWC	0.7014	-0.0067	-0.0353	0.0433	-0.0002	0.1958	0.4665
PFAC	0.7255	-0.0185	-0.0271	0.1042	0.0130	0.2006	0.4213
ILP	0.3676	0.0150	0.0005	0.1364	0.0369	0.0802	0.8383

TABLE 17 – Factor analysis Ethnic group and quality of public goods

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
ethnic _ID	-0.0924	-0.0549	-0.0195	0.0513	0.0689	0.9807
Etn. Political Influence	0.0705	0.5483	-0.0239	0.0009	-0.0043	0.6937
Etn. treated Unfairly	0.0957	0.3077	-0.0088	0.0083	0.0196	0.8956
Etn. condition	0.1283	0.5510	-0.0048	0.0049	-0.0041	0.6799
EXP	0.5126	-0.0056	0.3386	0.0148	0.0042	0.6223
BSP	0.6870	-0.0231	0.2627	0.0357	-0.0192	0.4568
TABS	0.7575	-0.0420	-0.1259	0.1574	-0.0189	0.3834
PTE	0.7243	-0.0594	-0.1819	0.1393	0.0061	0.4194
OWC	0.6945	-0.0529	-0.1288	-0.1659	-0.0077	0.4707
PFAC	0.7394	-0.0270	-0.0695	-0.1659	0.0008	0.4202
ILP	0.4101	0.0155	0.0370	-0.0272	0.0755	0.8238

Quatrième partie

Generale Conclusion

The aim of this dissertation is to contribute in the literature on the role of social capital with a particular interest on the ability of communities to achieve collective action. We extend the scope of existing studies encompass in developing countries. The analysis is carried out using two distinct approaches.

The first approach uses an original mixture of survey and experimental data on trust from four villages in Senegal to assess the capacity of trust to predict participation in provision of local public good. The relationship between different measures of trust and the individual decision to participate in provision of local public goods is firstly assessed. Indeed, the different trust measures are correlated with the individual's voluntary decision to participate in the provision of the local public goods such as *tontine* (that provide collective insurance systems for many African village communities (see (Anderson *et al.*, 2010)), *credit association* (which is an alternative to the formal financial system, which latter is inaccessible to the poor) and *animation* (which covers social-cohesion activities, such as the organization of sporting activities, cleaning the village, and environmental-protection activities). The results show that trust, as measured by survey questions, has poor predictive power, while the results from a simple experimental measure of trust are much better predictors of public-goods production.

Secondly, the trust measurement method issue is addressed by investigating whether trust can be measured as a latent trait, and how this relates to other trust-measurement methods. For this purpose, a class of latent trait model formulated by Muraki (2009), the Generalized Partial Credit Model, is used to construct the latent trait. Under this approach, a score is constructed in order to measure the latent trait in each individual, and the trait level estimates depend on both individual responses and the properties of

the questions that were administered. The validity of this method is assessed by building a score of latent-trait trust which is related to trust behavior in an experiment. The results show a positive and significant relationship between trusting behavior in the experiment and trust measured as a latent trait, while the GVS question is weakly related to latent trust.

In terms of policy implication, survey trust questions yield greater trust scores for individuals in higher social positions or with kinship with local leaders. If this correlation with respondents' social status is not taken into account, the results may be biased in favor of groups with higher social status and thus exclude certain individuals from full participation in the social and economic life of a community. This may in particular increase inequality in the access to opportunities. Thus survey trust questions fail to capture trust in the face of diversity, and furthermore fail to explain sufficiently trust levels that allow individuals with different social statuses to carry out collective activities despite their heterogeneity. To determine this latter level of trust, it is necessary to understand the social structure of the community group and identify respondents' social positions. This dissertation has suggested a straightforward way of overcoming this problem by showing that an adequately-designed trust game constitutes an effective tool to measure the trust behind individual decision to carry out joint activities.

The second approach consists in investigating the causal impact of trust in the quality of public goods produced at district level in Africa. The objectives are threefold : (I) to examine the determinants of the production of communities ability local public goods using a large database to get "*the picture*" (II) to assess the relative importance of social capital and ethnic diversity and (III) to use identification strategies that enable us to establish

causality.

To address these points, the Afrobarometer (www.afrobarometer.org) offers reliable cross-country data collected via individual interviews. This data allows us to calculate trust in more than 1000 districts, covering 18 sub-Saharan countries and almost 500 million inhabitants. Following common practice, trust is measured using the so-called GVS trust question. Since we here focus on local social interactions, we also use an alternative measure of trust at the local level. This allows us to create a proxy for social capital that is specific to a local area.

An inherited-trust variable is built to circumvent endogeneity problems caused by the co-variation of trust and the quality of public-good governance. Using information on the historical settlement patterns of ethnic groups in Sub-Saharan Africa, two measures of inherited trust are considered : trust in neighbors, and inherited generalized trust. The results show that inherited trust from the ethnic homeland accounts for a large part of current trust levels. We skirt any reverse-causality problems between trust and the quality of public goods, and omitted-variable bias due to endogenous ethnic sorting, by the use measure of initial population density in the ethnic homeland, which is used to instrument ethnic divisions.

Two local public goods are considered : access on basic health care (chapter 6) and schooling (Chapter 7). Results reveal that trust in neighbors (local trust) in the district affects both health-center quality and access to improved water ; ethnic diversity and generalized trust play only a limited role. The use of instrumental variables suggests that this relationship is causal. We find no relationship between ethnic fractionalization and the quality of public goods at the local level. Both trust in neighbors and generalized trust

successfully passed a battery of tests and robustness checks aiming at establishing a causal relationship.

We can thus claim that trust has a *causal* impact on the ability of a community to increase the quality of schools in their district. An interesting finding is that once trust is controlled for, ethnic fragmentation does only play a marginal role. In contrast to country-level findings, our results support the view that ethnic fragmentation has only a limited impact on the ability to produce local public good such as schools. OLS estimation is shown to underestimate the effect of trust on the quality of public goods. We attribute this to measurement error in the trust variables and the existence of local-area clubs which positively affect the quality of pubic goods but are negatively correlated with trust.

While much work has emphasized ethnic diversity as a factor behind poor economic outcomes of African countries, this does not seem to hold at the local community level. Local communities are seemingly better able to manage any adverse effects of ethnic division, with local trust (as a measure of social capital) playing a key role. In terms of policy recommendations, these results are consistent with the greater autonomous management of public goods by local communities. Of course, national policies play an important if not crucial role, but since African countries face very often only limited resources, empowering communities may well produce more successful results.

The results of this dissertation appeal to further research. The results from chapter 5 and 6 for example have shown that members of the communities undertake collective action and manage successfully local public goods despite ethnic diversity. This result contrast with macroeconomic evidence of the role of ethnic diversity. We can explore why ethnic diversity works at the national level and has no effect at the local level ? More precisely,

why members of ethnic groups unable to work at the national level along with working at the local level ?

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Appendices

1- GENERAL INSTRUCTIONS OF THE EXPERIMENT

Thank-you all for taking the time to come today. This game may take 3-4 hours, so if you think you will not be able to stay that long without leaving please let us know now. Before we begin I want to make some general comments about what we are doing here today and explain some rules that we need to follow. We will be playing a game for real money that you will take home. You should understand that this is not my own money. It is money given to me by my university to use to do a research study. This is research-which will eventually be part of a scientific article. I'm working together with many other university professors who are carrying out the same kind of games all around the world.

Before we proceed any further, let me stress something that is very important. Many of you were invited here without understanding very much about what we are planning to do today. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the game or not. If you have heard about a game that has been played here in the past you should try to forget everything that you have been told. This is a completely different game We are about to begin the game. It is important that you listen as carefully as possible, because only people who understand the game will actually be able to play it. I will run through some examples here while we are all together. You cannot ask questions or talk about the game while we are here together. This is very important and please be sure that you obey this rule, because it is possible for one person to spoil the game for everyone, in which case we would not be able to play the game today. Do not worry if you do not completely understand the game as we go through the examples here in the group. Each of you will have a chance to ask questions in private with me to be sure that you understand how to

play.

2- TRUST GAME INSTRUCTIONS

This game is played by pairs of individuals. Each pair is made up of a Player 1 and a Player 2. Each of you will play this game with someone from your own village. However, none of you will know exactly with whom you are playing. I'm the only who knows who is to play with whom and i will never tell anyone else. To remain anonymous, i will give a number code and an envelope to each player. Be sure that every decision that you will take here will be never revealed.

I will give 1000 CFA to each Player 1 and another 1000CFA to each Player 2. Player 1 then has the opportunity to give a portion of their 1000 CFA to Player 2. They could give any amount, or nothing. Whatever amount Player 1 decides to give to Player 2 will be tripled before it is passed on to Player 2. Player 2 then has the option of returning any portion of this tripled amount to Player 1. Then, the game is over.

Player 1 goes home with whatever he or she kept from their original 1000 FCA, plus anything returned to them by Player 2. Player 2 goes home with their original 1000 FCA, plus whatever was given to them by Player 1 and then tripled by me, minus whatever they returned to Player 1.

Here are some examples : 2.1. : Imagine that Player 1 gives 1000 CFA to Player 2. I triple this amount, so Player 2 gets 3000CFA (3 times 1000CFA equals 3000CFA) over

and above their initial 1000 CFA. At this point, Player 1 has nothing and Player 2 has 4000 CFA. Then Player 2 has to decide whether they wish to give anything back to Player 1, and if so, how much. Suppose Player 2 decides to return to Player 1 1500 CFA. At the end of the game Player 1 will go home with 1500 CFA and Player 2 will go home with 2500 CFA

2.2 : Now let's try another example. Imagine that Player 1 gives 750CFA to Player 2. I triple this amount, so Player 2 gets 2250CFA (3 times 750CFA equals 2250) over and above their initial 1000. At this point, Player 1 has 250CFA and Player 2 has 3250. Then Player 2 has to decide whether they wish to give anything back to Player 1, and if so, how much. Suppose Player 2 decides to return 0CFA to Player 1. At the end of the game Player 1 will go home with 250CFA and Player 2 will go home with 3250CFA.

2.3 : Now let's try another example. Imagine that Player 1 gives 500CFA to Player 2. I triple this amount, so Player 2 gets 1500 (3 times 500 equals 1500) over and above their initial 1000CFA. At this point, Player 1 has 500CFA and Player 2 has 2500CFA. Then Player 2 has to decide whether they wish to give anything back to Player 1, and if so, how much. Suppose Player 2 decides to return 750CFA to Player 1. At the end of the game Player 1 will go home with 1250 and Player 2 will go home with 1750.

Note that the larger the amount that Player 1 gives to player 2, the greater the amount that can be taken away by the two players together. However, it is entirely up to Player 2 to decide what he should give back to Player 1. The first player could end up with more than 4 or less than 4 as a result.

We will go through more examples with each of you individually when you come to play the game. In the mean time, do not talk to anyone about the game. Even if you are not sure that you understand the game, do not talk to anyone about it. This is important. If you talk to anyone about the game while you are waiting to play, we must disqualify you from playing.

(http ://jee.caltech.edu/files/2011/06/Script-Trust-Game.pdf)

Résumé en français

Le but principal de la présente thèse est d'étudier le rôle du capital social dans la capacité des communautés locales dans les pays en développement ÃĂ entreprendre une action collective efficace et produire des biens publics locaux par eux-mêmes. Cette thèse est motivée par l'évolution récente du modèle de développement économique qui a accordé une plus grande importance au capital social et la participation de la population locale. Je vais décrire le contexte et les objectifs de la thèse avant de présenter la méthodologie et les principaux résultats.

De l'ajustement structurel á l'autonomisation

Au cours des dernières décennies, l'approche du développement a été principalement basée sur la politique macroéconomique. Dans les années 1950 et 1960, par exemple, les stratégies de développement ont été dominées par l'industrialisation par substitution des importations (ISI), qui est basée sur l'idée selon laquelle un pays devrait tenter de réduire sa dépendance l'étranger via la production locale de biens industriels. L'idée était de développer certaines industries qui ont un effet d'entraînement important sur le reste de l'économie, et de produire localement des biens qui étaient auparavant importés. Le pays en question devrait donc être en mesure de produire par lui-même ce qu'il importait et cette politique était censée le mettre dans une position d'indépendance par rapport aux pays á partir duquel il importait. L'a stratégie d'ISI a cependant progressivement montré des limites dans les années 1970, l'amenant á être sérieusement remise en question dans les années quatre vingt.

Dans le milieu des années 1980, les termes du Consensus de Washington ont été utilisés pour décrire un ensemble de réformes standard de 10 prescriptions politiques qui mettaient l'accent sur la stabilisation macroéconomique, la privatisation et le développement du marché libre. La mise en oeuvre de ces programmes d'ajustement structurel (PAS) s'est avérée politiquement difficile pour la plupart des gouvernements, dont beaucoup ont choisi de ne faire aucune tentative sérieuse de répondre aux conditions des programmes. Plus récemment, á la fin des années 1990, les politiques de développement ont commencé á favoriser une approche dite de "bottom up" ou micro, reflétant un changement radical dans la façon précédente de réflexion sur les problèmes de développement. Un exemple frappant est l'introduction par la Banque Mondiale des concepts de "empowerment" et de "Développement communautaire" après son rapport sur le développement dans le monde de 2000 /1 "Combattre la pauvreté". Ce changement dans le paradigme du développement a été principalement motivée par les critiques formulées á l'égard des politiques d'ajustements structurels qui sont reprochés de ne pas accorder suffisamment d'attention á la dimension sociale du développement et des particularités locales. La participation et la responsabilisation des communautés figurent maintenant dans l'ordre du jour des débats sur le développement et sont devenus les objectifs des gouvernements et des agences internationales de développement.

L'empowerment est définie comme "*l'expansion des moyens et des capacités des pauvres á participer, négocier, influencer, maîtriser et responsabiliser les institutions qui affectent leurs vies*" (Narayan , 2002). La stratégie dite de "empowerment" peut être divisée en trois parties différentes visant la fourniture de services efficaces pour les pauvres. Le premier consiste á encourager la décentralisation de la fourniture de biens et services publics

locaux y compris les soins de santé, l'éducation, l'eau, les routes et les infrastructures de base autour des unités territoriales locales comme les districts, les municipalités ou les communes. La seconde est de parvenir à une plus grande participation des citoyens au niveau local afin de développer un meilleur partenariat de prestation de services. Le troisième est de renforcer la capacité organisationnelle locale, qui renvoie à la capacité des communautés à travailler ensemble, d'organiser et de mobiliser des ressources pour résoudre les problèmes d'intérêts communs et d'entreprendre une action collective autonome.

Les limites de l'action collective

Cependant, la littérature théorique existant est pessimiste quant à la capacité des communautés locales à mener une action collective à cause de la tentation de "free-riding". Un membre d'un groupe peut tirer avantages des efforts de tous les autres membres du groupe, et tout le monde peut bénéficier considérablement de l'action collective. Egocentrique, rationnels et égoïstes, les agents vont s'engager dans un calcul coûts-avantages. Leur intérêt réside dans la participation personnelle limitée, puisque celle-ci est coûteuse, mais en profitant des avantages acquis par les efforts de ceux qui se sont impliqués. Ce comportement, si elle était généralisée, conduit à l'absence de toute action collective. Pour Olson (1965), les individus ne seront pas engagés dans une action collective sans coercition ou incitations sélective. La conclusion d'Olson est cependant remise en question dans le point de vue économistes néo-institutionnels. Ostrom (1990), par exemple, tout en reconnaissant que la tentation de resquiller est un phénomène réel, souligne que celle-ci n'est pas suffisante dans la pratique pour détruire toute chance de parvenir à une action collective efficace. Alors que certaines communautés sont incapables de mener des activités conjointes, ils sont nom-

breux les exemples de communautés qui ne se livrent avec succès dans une action collective pour gérer les ressources locales (Ostrom, 1990 ; Khwaja , 2005)

Action collective et Capital Social

L'importance des normes et des règles telles que la confiance et l'altruisme en encourageant un comportement coopératif partagés communautaires est l'un des facteurs mis en évidence dans cette littérature que pour expliquer le succès de l'action collective. Ces caractéristiques des relations et des normes sociales, qui sont également appelées capital social (Putnam, 2000), sont reconnues comme des facteurs déterminants de la performance économique (Ostrom , 1990). Dans les travaux bien connus de Coleman (1990) et Putnam (2000), il est utilisé de façon convaincante pour expliquer l'évolution sociétale. Putnam a adapté l'approche de Coleman pour étendre le concept de capital social à l'analyse de la dynamique sociale des communautés et des nations , en particulier dans son travail de pionnier sur la relation entre la performance des établissements et la densité des associations (un indicateur de capital social) dans les régions italiennes en 1994 et les Etats-Unis en 2000. Ce travail a inspiré beaucoup d'autres recherches ultérieures utilisant le capital social pour expliquer des phénomènes aussi divers que la création capital humain, la démocratie dans certaines institutions, la réduction de la pauvreté, etc. Les ONG, les gouvernements ainsi que le discours populaire se réfèrent aujourd'hui régulièrement à ce concept de capital social pour expliquer de nombreux aspects de la vie sociale. Par exemple, la Banque mondiale a lancé un programme de recherche sur le capital social dénommé SCI. En adoptant le concept de capital social, la Banque mondiale a pour but de trouver un instrument utile pour améliorer l'efficacité des projets de développement.

Plan de la thèse

Le but principal de la présente thèse est d'étudier le rôle du capital social dans la capacité des communautés locales dans les pays en développement à entreprendre une action collective et de produire des biens publics locaux par eux-mêmes. Cette thèse est composée de trois parties. La première partie passe en revue la littérature sur l'action collective, la confiance et la fourniture de biens publics locaux. La deuxième partie analyse le rôle du capital social au niveau individuel en utilisant une des méthodes expérimentales (chapitres 3 et 4) et troisième partie analyse l'effet causal du capital social dans la capacité à gérer publique locale au niveau du district en utilisant la méthode économétrique (chapitres 5 et 6).

L'analyse est effectuée en utilisant deux approches distinctes.

La première approche utilise un mélange original d'enquête et des données expérimentales sur la confiance de quatre villages au Sénégal pour évaluer la méthode de mesure la confiance et la décision de participer à certaines activités de fourniture de biens publics locaux. Le chapitre 3 examine la mesure dans laquelle différentes (mesures fondées sur des enquêtes et des mesures expérimentales) de confiance sont reliées à la capacité d'une communauté à produire des biens publics locaux. L'objectif est de clarifier quelle méthode de mesure de la confiance est mieux pour expliquer comment les individus hétérogènes parviennent à livrer à des activités conjointes, malgré le problème associé de free-riding. Les résultats montrent que la confiance, telle que mesurée par les questions de l'enquêtes, a une faible pouvoir prédictif, alors que les résultats d'un simple jeu d'investissement (une méthode expérimentale de mesurer la confiance) sont bien meilleurs prédicteurs de la par-

ticipation aux activités de production de biens publics. Le chapitre 4 utilise la méthode d'analyse des traits latents pour mesurer la confiance et compare ensuite les résultats aux comportements confiance observés dans des expériences. Un score basé sur les réponses individuelles et les propriétés de la question posée est d'abord construit dans le but de capturer le trait latent de chaque individu. La validité de cette mesure est ensuite évaluée en établissant dans quelle mesure le trait latent prédit le comportement expérimental. Les résultats montrent une relation positive et significative entre la confiance de l'enquête et le comportement de la confiance dans les expériences.

La deuxième approche examine l'impact causal de la confiance dans la qualité des biens publics produits au niveau du district en Afrique. L'objectif peut être décliner en trois parties : (I) examiner les déterminants de la production des communautés capacité des biens publics locaux en utilisant une grande base de données pour avoir une "image" globale (II) évaluer l'importance relative du capital social et de la diversité ethnique et (III) utiliser des stratégies d'identification qui nous permettent d'établir la causalité. A cet effet, la série 3 des enquêtes d'Afrobaromètre de 2005 est utilisée. Pour contourner les problèmes d'endogénéité causés par la co-variation de la confiance et de la qualité des biens publics, une variable mesurant la confiance héritée des groupes ethniques est utilisée. Cette stratégie suit la même logique que dans Algan et Cahuc (2010) et Uslaner (2008b), qui montrent que la confiance se transmet de génération en génération. En utilisant l'information sur les variations historiques des normes des groupes ethniques en Afrique sub-saharienne, deux mesures de confiance héritée sont considérées : la confiance, dans les voisins, héritée et la confiance généralisée héritée. Ces deux mesures de confiance héritée sont utilisées pour tester l'impact causal de confiance sur la de la bonne gouvernance des biens public à travers

un grand nombre de districts en Afrique sub-saharienne. Dans le chapitre 5, par exemple, le rôle du capital social et des divisions ethniques dans la détermination de l'accès aux soins de santé de base est testé. Les résultats montrent que la mesure de la confiance locale (niveau de confiance dans les voisins) a un effet causal sur les comportements liés à la santé ménages, sur l'accès communautaire à de l'eau améliorée et sur la qualité des centres de santé. Une hausse d'un pourcent de la confiance localisée réduit absentéisme des médecins de .421 pourcent, le temps d'attente de 0,57 pourcent, les paiements de santé illégaux par 0,512 pourcent et le manque d'attention par le personnel médical de 0,738 pourcent. La fragmentation ethnique et la confiance généralisée ne jouent qu'un rôle marginal. Le chapitre 6 tient à souligner l'importance du capital social de promouvoir de meilleures écoles en Afrique. Les résultats montrent que cette augmentation d'un écart-type au niveau local, la confiance augmente la qualité des biens publics locaux en 0,17 à 0,39 en écart-type. Une fois que nous contrôlons la confiance, la fragmentation ethnique ne joue qu'un rôle marginal.

Les sections suivantes résument les détails du contenu de chaque chapitre de la thèse.

Chapitre 1 : Elinor Ostrom et la gouvernance des biens communs

Le 12 octobre 2009 Elinor Ostrom recevait le Prix Nobel d'économie pour sa contribution à l'analyse des biens collectifs. Ce chapitre se propose de dresser un panorama de ses travaux. Nous avons commencé par retracer l'itinéraire académique et professionnel d'Ostrom. Dans une deuxième partie, nous avons montré comment elle a mobilisé successivement différentes méthodes d'investigation tout au long d'un itinéraire qui part de l'étude minutieuse de multiples situations concrètes pour évoluer vers des recommandations de

politiques publiques pour le compte de grands organismes internationaux. En conclusion, nous avons évoqué les implications qu'elle tire de son travail pour contribuer à un renouvellement des théories de la rationalité.

Chapitre 2 : Confiance et performance économique : une revue de la littérature

Ce chapitre examine les aspects de la recherche récente sur le rôle de la confiance dans l'économie développement. Il commence par examiner les différentes interprétations données à cet insaisissable concept qui est la confiance, et les différentes façons de mesurer la confiance. L'analyse porte ensuite la littérature empirique sur le rôle de la confiance dans l'explication de la performance économique. Enfin, l'effet de la coopération dans la fourniture de biens publics est analysée en mettant l'accent sur les communautés ethniquement diverses en Afrique.

Chapitre 3 : La confiance comme un indicateur de la capacité de produire des biens publics locaux : tests de différentes mesures

Ce chapitre a examiné les forces et les faiblesses des différentes formes de mesures de confiance. L'objectif principal était de voir laquelle de ces mesures peut expliquer pourquoi certains individus mener des activités conjointes. Pour ce faire, une version du Jeu de l'investissement, la CCT, est implantée dans une petite communauté villageoise dans l'ouest du Sénégal, dont les résultats des questions de confiance de l'enquête sont comparées : la confiance question GVS et questions spécifiques concernant la confiance dans les voisins

et la confiance dans les étrangers. Les résultats montrent que la confiance, tel que mesuré par les questions de l'enquête, a un faible pouvoir prédictif, alors que les résultats d'un simple jeu d'investissement ont un bien meilleur pouvoir predictif de la décision de participer à la production des biens publics. Plus particulièrement, une augmentation unitaire du montant envoyé dans le jeu de l'investissement augmente les chances de participation à la Tontine de 2,3%, les chances de participer à crédit Association de 2,6% et les chances de participation à des activités d'animation de 1,7%.

Ces résultats ont d'importantes implications politiques, et en particulier pour la promotion des organismes communautaires sur le capital social. Des questions de confiance de l'enquête rendement supérieur scores de confiance pour les individus dans des positions sociales plus élevées ou avec la parenté avec les dirigeants locaux. Si cette corrélation avec le statut social des personnes interrogées ne sont pas prises en compte, les résultats peuvent être biaisés en faveur des groupes ayant un statut social plus élevé et donc exclure certaines personnes de participer pleinement à la vie sociale et économique d'une communauté. Cela peut en particulier renforcer les inégalités dans l'accès aux opportunités. Ainsi, les questions d'enquêtes mesurant la confiance ne parviennent pas à capter la confiance dans le en présence de diversité, et de plus ne parviennent pas à expliquer suffisamment confiance à des niveaux qui permettent aux individus de différents statuts sociaux pour mener des activités collectives en dépit de leur hétérogénéité. Pour déterminer ce dernier niveau de confiance, il est nécessaire de comprendre la structure sociale du groupe de la communauté et d'identifier les positions sociales des répondants. Cela nécessite donc que le chercheur passe du temps dans ces communautés afin de comprendre la complexité des

normes et des règles communautaires. Toutefois, étant donné la diversité et la complexité de ces dernières, ce sera difficile, surtout quand la diversité n'est pas facilement observable. Ce chapitre a suggéré un moyen simple de résoudre ce problème en montrant qu'un jeu d'investissement adéquatement conçu constitue un outil efficace pour mesurer la confiance expliquant décision individuelle à mener des activités conjointes.

Chapitre 4 : Mesure de confiance comme un trait de personnalité latente : validité et les relations avec le comportement dans le jeu de confiance

Le but de cet article était de déterminer si la confiance peut être mesurée comme un trait latent, et comment cela se rapporte à d'autres méthodes de mesure de confiance. A cet effet, une classe de modèle de trait latent formulée par Muraki (2009), le Generalized Partial Credit Model, est utilisé pour construire le trait latent. Selon cette approche, un score est construit afin de mesurer le trait latent chez chaque individu, et les estimations au niveau des traits dépendent à la fois des réponses individuelles et les propriétés des questions qui ont été administrés. Nous utilisons un ensemble de données d'enquête de quatre villages sénégalais oú enquêtés devaient répondre à une série de questions sur leurs attitudes de confiance concernant un éventail d'individus et de groupes : ceux-ci sont utilisés pour construire un score latente confiance.

La validité de cette méthode est évaluée par la comparaison du score de trait latent de confiance aux comportements de confiance dans une expérience. Les résultats montrent que le trait de confiance obtenu a une relation positive et significative avec le comportement de confiance dans les expériences. Les personnes dans le quatrième quartile de la distribution sont plus confiantes dans l'expérience par rapport à ceux du premier quartile, la

différence étant statistiquement significative. Malheureusement, nous ne trouvons pas ces bons résultats dans le lien entre la confiance mesurée comme un trait de personnalité et les réponses à la question standard de confiance du World Value Survey. En particulier, seuls les individus dans le troisième quartile ont des niveaux de confiance plus élevés fixés.

Les résultats de cette étude interviennent dans la littérature sur la comparaison de l'enquête et mesure expérimentale de confiance. Le jeu de la confiance a été utilisé par Glaeser et al. (2000), Fehr et al. (2003) et Danielson et Holm (2005) pour tester la validité des questions de confiance attitudes avec des résultats mitigés. L'utilisation d'un échantillon d'étudiants de Harvard, Glaeser et al. (2000) comparent les questions relatives aux attitudes de comportement dans le jeu de l'investissement. Ils trouvent que la confiance mesurée par les questions relatives aux attitudes n'est pas corrélée avec le niveau de confiance dans le jeu de la confiance. Contrairement Glaeser et al. (2000), Fehr et al. (2003) utilisent un échantillon de ménages allemands, et de constater que la confiance des attitudes est corrélée avec un comportement dans le jeu de la confiance. Danielson et Holm (2005) observent des différences similaires dans le lien entre les deux méthodes de mesure de la confiance entre les études Tanzanie Suède

Chapitre 5 : Est-ce que la confiance et les divisions ethniques sont importantes pour l'accès aux soins de santé primaires de base en Afrique subsaharienne ?

Ce chapitre utilise les données Afrobaromètre pour tester le rôle du capital social et les divisions ethniques dans la détermination de l'accès aux soins de santé de base. Conformément aux évolutions récentes de la littérature sur les valeurs culturelles, le niveau de

capital social est capturé par le niveau moyen de confiance et la divisions ethniques par l'indice de fragmentation ethnique proposé par Easterly et Levine (1997).

Ce chapitre contourne le problème de la causalité inverse entre la confiance et la qualité des biens publics et les problèmes de variables omise en raison de tri résidentiels endogène, par l'utilisation de données historiques sur les modes d'établissement de groupes ethniques en Afrique sub-saharienne. Ces données fournissent des mesures de confiance héritée qui est utilisé un instrument de confiance, et une mesure de la densité de la population initiale dans la patrie ethnique, qui est utilisé à bord des divisions ethniques. Les résultats montrent que la confiance locale héritée a un effet causal sur les comportements liés à la santé ménages, l'accès communautaire à de l'eau améliorée et à la qualité des centres de santé. Les résultats montrent qu'une hausse de un pourcent dans la confiance localisée réduit l'absentéisme des médecins de .421 pourcent, du temps d'attente de 0,57 pourcent, des paiements de santé illégaux par 0,512 pourcent, et du manque d'attention par le personnel médical de 0,738 pourcent. La fragmentation ethnique et la confiance généralisée ne jouent qu'un rôle marginal. Ce chapitre fait également appel à un ensemble d'autres contrôles pour voir s'il existe un effet de sélection. L'effet de la confiance est robuste et cohérente entre les différentes spécifications du modèle et l'inclusion de contrôles supplémentaires. La méthode des MCO est semble sous-estimer l'effet de la confiance sur la qualité des biens publics. Cela peut être attribué à une erreur de mesure dans les variables de confiance et à l'existence d'un biais due aux éventuelles clubs locaux dans les districts qui peuvent avoir une incidence positive sur la qualité des biens publics mais sont corrélés négativement avec confiance.

Chapitre 6 : Qu'est ce qui détermine la qualité des écoles en Afrique ? Démêler le capital social et la division ethnique

Les communautés locales africaines sont souvent confrontées à des ressources gouvernementales limitées. Ces communautés comptent généralement sur une action collective pour fournir des biens publics de base, souvent avec l'aide d'organisations non gouvernementales. Les écoles ne font pas exception. Ces communautés se chargent d'acheter généralement des manuels, des fournitures scolaires, des matériel pédagogique et didactique, et de maintenir les bâtiments scolaires. A l'extrême, les communautés ne reçoivent aucune aide gouvernementale et peuvent avoir le plein contrôle sur l'offre de l'enseignement primaire (voir par exemple Miller-Grandvaux et Yoder (2002)). Bien que ces écoles communautaires ont leurs avantages et inconvénients, un consensus a émergé qu'ils devraient être encouragés en tant que moyen efficace de fournir une éducation de base en Afrique. De nombreux programmes nationaux et internationaux ont été mis en oeuvre pour accroître la participation des communautés locales (voir Yamada (2013)). En conséquence, en Afrique plus que partout ailleurs dans le monde, la qualité de l'école dépend essentiellement de la capacité de la communauté à s'engager dans une action collective. Il est donc important de comprendre la capacité des communautés africaines à s'engager dans une action collective et d'améliorer la qualité de l'école.

Deux théories sur la capacité de la communauté africaine à s'engager dans l'action collective et à améliorer la qualité des écoles ont vu le jour. Les preuves des comparaisons inter-pays soulignent la division ethnique comme étant une limite à l'action collective en Afrique. D'autre part, le travail sur le terrain montre que le capital social (c'est à dire la

capacité de la communauté à s'engager dans une action collective ou d'établir des normes communes) est le principal moteur de la qualité des biens publics locaux. Ce chapitre utilise les données Afrobaromètre pour tester le rôle du capital social et les divisions ethniques dans la détermination des écoles de qualité. Le niveau de capital social est capturé par le niveau moyen de confiance et de divisions ethniques par l'indice de fragmentation ethnique. Nous réglons les problèmes de causalité inverse entre la confiance et la qualité des biens publics à l'aide des données historiques sur les modes d'établissement de groupes ethniques en Afrique sub-saharienne : cela donne des mesures de confiance héritée des groupes ethniques que nous utilisons comme instrument pour la confiance actuelle. Pour résoudre les problèmes concernant le tri résidentiel endogène, nous avons instrumenté la fragmentation ethnique par la densité de la population initiale des tÃľrritoires ethniques historiques. Les résultats montrent qu'une augmentation d'un écart-type au niveau local, la confiance augmente la qualité des biens publics locaux en 0,17 à 0,39 en écart-type. Une fois que la confiance est contrôlée, la fragmentation ethnique ne joue qu'un rôle marginal.