Social Network and Social Protection: Evidence from Cameroon

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CEREG-University of Yaoundé 2

12 June 2012

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June 2012

Abstract

Household in developing countries use a variety of informal and formal mechanisms to cope with risk, including mutual support and public social security program. The present study addresses the issue of the relationship between social network and social protection both formal and informal. Using dataset of Cameroon's survey on employment and informal sector (EESI[2], 2005) and after controlling for the endogeneity of social network, our results suggest two main facts. First, while the relationship between social network and formal social protection is not significant, there is a strong and positive effect of social network on informal social protection. Second, formal social protection and informal social protection are substitute in Cameroon.

Keywords: Social Network, Social protection, _Probit, Tobit, Cameroon_

JEL Classification: C25, Z13

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1. INTRODUCTION

This paper analyzes the relationship between social network, formal social protection and informal social protection in Cameroon. Using dataset of Cameroon's survey on employment and informal sector (EESI[3], 2005) and after controlling for the endogeneity of social network, our results suggest two main facts. First, while the relationship between social network and formal social protection is not significant, there is a strong and positive effect of social network on informal social protection. Second, formal social protection and informal social protection are substitute in Cameroon.

There is a growing recognition that social protection is an essential component of an effective development strategy (Fouarge, 2003; Barrett et al, 2008). Indeed, as demonstrated by Barrett et al (2008), there are potentially large returns of social protection policies that stake out a productive safety net below the vulnerable and keep them from slipping into poverty trap. However, while most of the households in low income countries are exposed to a variety of risks and external shocks (illness, disability, death, unemployment, crop failure and natural catastrophe), few of them are able to prevent and mitigate risks. They are therefore less able to cope with the consequences of shocks (Churchill, 2006). In this vein, social protection, both formal and informal is essential to prevent people from failing into poverty trap (Jacquier et al, 2006). Unfortunately in most of low income countries, Cameroon to be specific, few peoples are covered by the formal social protection skim and have to depend largely on informal social protection such as household transfers and micro self insurance. In the specific case of Cameroon, the empirical evidence suggest that less than 18% of labor force have access to formal social protection and most of them (90.5%) are working in the informal sector (EESI, 2005).

While the issue of social protection is at the heart of an increasing body of literature in economic and social science (Dercon and Krishnan, 2003; Duflo, 2003;Calvo and Romero, 2009; Asher, 2010), little attention has been devoted to the relationship between social network and both formal and informal social protection. Moreover, the possible substitution between formal social protection and informal social protection is less clear. In this respect, the main contribution of this paper is twofold. First this paper addresses the issue of the effect of social network on both formal and informal social protection in Cameroon. Second, the paper addresses the question of substitutability between formal social protection and informal social protection in Cameroon. Following these objectives, this paper is a first attempt to fill the gap observed in the literature.

There are several mechanisms through which social network, formal social protection and informal social protection are related. Social network convey useful information in the job search process such that individuals with larger networks should experience a high job arrival rate (Granovetter, 1995, Montgomery, 1991, Calvo-Armengol and Jackson, 2004, Patacchini and Zenou, 2008). In the specific case of Cameroon which is pervaded with informality to great extent, social network helps get a job in the formal sector. Since formal jobs are automatically covered by the formal social protection system, social network positively affects formal social protection. Moreover, formal jobs exhibit better remuneration than the informal one. Thus peoples who work on formal sector are more able to subscribe for a formal insurance. Besides, social network induces trust and a network of solidarities which force each member of the network to bring a support for the other one in case of shocks such as a decline in production and consumption, natural disaster, health and education concerns

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[3] Enquête sur l'emploi et le secteur informel

(Narayan, 1999; Hoogeveen, 2001). Finally, as suggested by Alesina and Giuliano (2007), there is a possible substitution between formal and informal social protection due to the fact that individuals with strong family ties exhibit a preference to the informal social protection. This preference is justified by the fact that a system of formal social protection supposes a permanent increase of the taxes. This increase makes de facto less costly the resort to the informal social protection. In contrast, the individuals who have weak family ties exhibit a preference for the formal social protection skim. Indeed, they cannot count reasonably on the family support

The remainder of the paper is structured as follow: Section 2 is devoted to the econometric model, description of variables and the presentation of estimation methods. Section 3 discusses the results and section 4 concludes.

2. ECONOMETRIC MODEL

In this section, we present three models. The first model is devoted to the relationship between social network and formal social protection. In this model, we want to test the hypothesis that the resort to social network positively influences formal social protection in Cameroon. The second model is constructed to test the hypothesis according to which social network has a positive effect on informal social protection in Cameroon. The third model test whether formal social protection and informal social protection are substitutes or complements why controlling for the effect of social network. Later on, we present data sources and we discuss about identification strategy.

2.1. An Econometric equation of the relationship between social network and formal social protection

We specify the following equation:

$$fsp_i = \alpha_0 + \alpha_1 sn_i + X_i^{'}\beta + \varepsilon_i \tag{1}$$

Where fsp, sn and ε represent respectively the binary variable of formal social protection which takes value 1 if the individual benefit for the public social protection skim and 0 otherwise, a binary variable of social network which takes the value 1 if the individual use the social network while looking for a job and 0 otherwise, and the error term. X is the vector of control variables which contains all individual characteristics such as age, marital status, religion and education. The subscript i is the index of individuals.

2.2. An Econometric equation of the relationship between social network and informal social protection

We specify the following equation:

$$isp_i = \delta_0 + \delta_1 sn_i + X_i^{'}\gamma + \eta_i \tag{2}$$

Where isp is the variable of informal social protection which is captured by the volume of transfers between households? The vector X is the vector of control variables as described above. The error term is represented by η.

2.3. An Econometric equation of the relationship between formal social protection and informal social protection

Is there substitutability or complementarity between formal social protection and informal social protection? The following model is specified in order to answer this question:

$$isp_i = \phi_0 + \phi_1 fsp_i + \sigma sn_i + X_i^{'}\psi + \tau_i \qquad (3)$$

In this equation X is the vector of individual characteristics as described in 2.1 and 2.2. The equation (3) tests the hypothesis according to which an increase in formal social protection prevalence reduces the volume of transfers between households. However, we also test the reverse causality. May be the better way to address this question is to run a simultaneous equations system. However, due to the structure of the variables of social protection, this is quite difficult. In fact isp is a left censored variable and it is suitable to use a Tobit model while fsp is a discrete binary variable and lead to the use of Probit model.

2.4 Formal social protection, informal social protection and social network measures and data sources

Formal social protection is a binary variable which takes value 1 when the individual benefit for the public social protection skim. Informal social protection is measured by the volume of transfers between households. This choice is mainly supported by the works of Dercon and Krishnan (2003), Calvo and Romero (2009). In fact one expect that the higher is volume of inter household transfers, higher is the probability of risk sharing. Social network is measured by a binary variable which takes the value 1 when the individual use friends and relatives while looking for a job and 0 otherwise. This variable is chosen for two main reasons. First, this variable reflects as well the mobilization of social network as the stock of relationships (Mouw, 2003). In fact, while it is possible to have a high density of social relations without making use of them, it is difficult to make use of the network of relations when your social network is empty. Second, this variable is the only social network variable available in our database. The variables used in this study are drawn from EESI(2005) which is the Survey on Employment and Informal Sector in Cameroon. This survey has a national cover and has been realized with 8540 households, that is 14606 individuals.
Table 1 presents the descriptive statistics of each variable used in the estimation.

Table 1: Descriptive Statistics

Variables	Observations	Mean	Std-Dev	Minimum	Maximum
Formal social protection	4888	0.13	0.33	0	1
Informal social protection	13682	0.15	0.58	0	16
Social Network	5556	0.42	0.49	0	1
Age	8655	29.68	11.19	15	60
Age squared	8655	1006.6	771.1	225	3600
Married	14556	0.12	0.33	0	1
Protestant	14560	0.29	0.45	0	1
Primary education	14564	0.33	0.47	0	1
Secondary technical education	13065	0.09	0.29	0	1
Secondary general education	14564	0.29	0.45	0	1
High education	14564	0.06	0.25	0	1
Household size	14574	6.57	3.82	0	30
Fathst	6365	0.06	0.24	0	1

2.5. Identification Strategy and the endogeneity of social network

An important issue of the econometric test is about the endogeneity of social network. Indeed, the study explicitly allows for the possibility that network are not chosen randomly, but rather

that some characteristics such as unobserved preferences or unobserved group characteristics determine the use of social network. Besides, the reverse causality between social protection and social network can also lead to endogenous bias. Another issue with the social network measure is the concern of measurement error. This problem is common to survey data and may be explained by the fact that sometime the surveyed thinks that to admit using friends and relatives is like confessing that one has not the qualifications required for the job. For all the reasons cited above, we need strong and valid instrument in order to avoid inconsistent estimates. We use the size of household as an instrument of social network. The idea behind this choice is the following: most of household in sub-Saharan African countries is made off by a large number of members. This generates social interactions and a network of solidarities. As argued by Putnam (2000), the high-density living increases social capital and thus social interactions. This argument is in line with sociological literature (Fischer, 1982) which argues that people living in large areas have a good deal of choice in constructing their social network and can seek out others with similar values and lifestyle. Besides, living in a household with a large number of members does not only increase social interaction, but also allow each member to benefit for the social network of others. In the same vein, Fischer (1982) clearly states that most adults encounter peoples through their families. Using a survey on personal network in Toulouse (France), Grossetti (2005) shows that more than 42% of friends are found through family. Moreover, Brueckner and Largey (2006) show that social network is an increasing function of population density while Wahba and Zenou (2004) use the latter as a proxy of social network. At the level of household this result can hold in the sense that persons living in larger households have high alternatives for exchange within the household and are able to benefit for external support through the network of each member of the household. Besides, the size of the household is exogenous in most empirical analysis. Indeed even if the size of household may change over the time, this change is not easy predictable.

On the methodological plan, we check whether the instrument chosen is weak or not. Indeed, if the instrument is weak, the coefficient of social network will be weakly identified and the estimates biased [(Dufour (1997; 2003), Staiger and Stock (1997), Doko and Dufour (2008)]. We run the weak instrument test proposed by Stock and Yogo (2005). This test also confirms the rejection of the null hypothesis as far as the Cragg-Donald Wald test F statistics are sufficiently high and above the critical values (see table 2, 3 & 4 in appendix).

3. RESULTS

We present the results of the impact of social network on social protection. For each model, we compare OLS and the relevant specification (Probit in the case of formal social protection and Tobit in the case of informal social protection).

3.1. The non significant impact of social network on informal social protection

Table 2 in appendix presents the results of the equation (1). We compare OLS regressions (column 1), Probit regression (column 2) and instrumental variable Probit (column 4). As we can see, the results are quite robust to the estimation methods when we do not take into account the endogeneity of social network. In this case, the effect of social network on formal social protection is positive and significant. Talking about instrumental regression, the first stage of instrumental variable Probit show that our instrument is significantly correlated to the endogenous regressor. Moreover, the Cragg-Donald Wald Fstat shows that the instrument is not weak. However, the effect of social network on formal social protection is not significant after the correction of endogenous bias. Besides, we also notice that most of the explanatory variables have the correct sign. It is for instance the case of all education variables (primary,

secondary and high education) that are positively correlated to formal social protection. Moreover there is a non linear relationship between formal social protection and age.

3.2. The positive effect of social network on informal social protection

The results of the estimation of the effect of social network on informal social protection are presented in table 3. Columns (1), (2) and (4) present respectively the OLS estimates, Tobit and Instrumental variable Tobit estimates. First, the results of OLS estimates differ from those of Tobit model in terms of magnitude and significance of coefficients. Second, the issue of endogeneity matters. Indeed, after correcting for endogenous bias, the effect of social network on informal social protection is positive and significant. This result is in line with those of Dercon and Krishnan (2003), Calvo and Romero (2009) who put a strong emphasis on the role of social network as a safety net against shocks.

3.3. The inverse relationship between formal social protection and informal social protection

Table 4 presents both the instrumental variable Probit and instrumental variable Tobit of the relationship between formal and informal social protection. Looking at column (1), one observes that the causal effect of informal social protection on formal social protection is significant and negative. In order to account for reverse causality, we also run a regression of the informal social protection on formal one using a Tobit model. The same inverse relationship is observed (see column 2). Summing up, there is an inverse relationship between formal social protection and informal social protection. This result confirms those obtained by Alesina and Giuliano (2007). Specifically, this result shows that both formal social protection and informal social protection are substitutes for each other.

4. CONCLUDING REMARKS

While an increasing body of literature put a strong emphasis on the role of social network as safety net in order to cope with shocks, few papers have attempt to establish a relationship between social network and both formal and informal social protection. This paper is an attempt to fill this gap.

Specifically, we address two main issues. First we analyze the effect of social network respectively on formal and informal social protection. Second, we address the issue of substitution between formal and informal social protection. Using dataset of Cameroonian survey on employment and informal sector (EESI, 2005), we provide three evidences. First, there is no significant effect of social network on formal social protection. Second, there is a positive and significant effect of social network on informal social protection. Finally, the obtained results show that formal social protection and informal social protection are substitutes in the specific case of Cameroon.

The results drawn from this paper suggest that as far as the implementation of formal social protection is costly, all policies promoting informal social protection, notably through social capital improvement and the increase of inter households transfers are important in order to cope with shocks.

REFERENCES

Alesina, A. & P. Giuliano. (2007), « The Power of Family », IZA Discussion Papers N°2750

Asher, M. G. (2010), "The Global Economic Crisis: An Opportunity to Strengthening Asia's Social Protection Systems?", ADBI Working Paper N° 198

Barrett, C., B. M.R. Carter & M. Ikegami. (2008), "Poverty Trap and Social Protection", SP Discussion Paper N°0804, Social Protection and Labor, World Bank

Brueckner, J. K & A. G. Largey. (2006), **"**Social Interaction and Urban Sprawl", Working Paper N°060707, University of California-Irvine, USA.

Calvó-Armengol, A. & M. O. Jackson. (2004),"The Effect of Social Networks on Employment and Inequality

Calvo, C. & J. Romeo. (2009), "Informal Risk Sharing and Poverty Persistence", CSAE, Working Paper serie N°2009-19, Oxford

Churchill, C.(2006), "Protecting the Poor – A Micro-insurance Compendium*"*, Geneva, Switzerland: International Labour Office.
Dercon, S. & P. Krishnan. (2003), "Food Aid and Informal Insurance", CSAE, Working Papers series/2003-01, Oxford

Duflo, E. (2003),"Grandmothers and granddaughters: old-age pensions and intrahousehold allocation in South Africa". *The World Bank Economic Review*, 17(1),1-25.
Doko, F., & J.M. Dufour. (2008), "Instrument endogeneity and identification-robust tests: some analytical results", *Journal of Statistical Planning and Inference 138(9), 2649–2661.*
Dufour, J.-M. (1997), "Some impossibility theorems in econometrics, with applications to structural and dynamic models". *Econometrica 65, 1365–1389.*
Dufour,J.-M. (2003),"Identification, weak instruments and statistical inference in econometrics", *Canadian Journal of Economics 36(4), 767–808*
Fischer, C.S. (1982), "To Dwell Among Friends", *University of Chicago Press, Chicago.*

Fouarge, D. (2003), " Costs of non-social policy: Towards an economic framework of quality social policies and the costs of not having them*"*, Brussels, Belgium: Employment and Social Affairs DG, European Union.
Granovetter, M. (1995),"*Getting a Job:A Study of Contact and Career*", Cambridge,2 edition
Grossetti, M. (2005), « Where do Social Relations Come From ? A Study of Personnal Network in the Toulouse Area of France", *Social Network 27 289-300*
Hoogeveen, H. (2001), « Evidence on Informal Insurance in Rural Zimbabwe », Tinbergen Institute Discussion Paper, Ti-2001-001/2.Rotherdam, Netherland

INS Cameroun (2005)**,** « Enquête sur l'Emploi et le Secteur Informel au Cameroun », Institut National de la Statistique du Cameroun, Décembre.

Jacquier, C., Ramm, G., Marcadent, P. and V. Schmitt-Diabate. (2006), "The social protection perspective on micro-insurance", In: Churchill (2006), *op. cit*., 45–64.
Montgomery, J.D. (1991), "Social Networks and Labor-Market Outcomes: Toward an Economic Analysis", *The American Economic Review* 81(5), 1408-1418.

Mouw, T. (2003), "Social Capital and Finding a Job: Do Contact Matter?" *American Sociologic Review, Vol. 68, N° 6, pp. 868-898*

Narayan, D. (1999), "Bond and Bridge: Social Capital and Poverty", World Bank Poverty Group, World Bank, Washington

Patacchini, E & Y. Zenou. (2008)**,** "Ethnic Network and Employment Outcome", *IZA Discussion Papers N° 3331*

Putnam, R. (2000), *"Bowling Alone"*, New York: Simon and Schuster.

Stock, J.H. & M. Yogo. (2005), **"**Testing for Weak Instruments in Linear IV Regression", *In: D.W. Andrews, J.H.Stock, eds, Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothemberg. Cambridge University Press, Cambridge, UK., Chapter 6, pp.80-108*

Wahba, J & Y. Zenou. (2004), "Density, Social Networks and Job Search Methods/ Theory and Application to Egypt", *Working Papers N°629, Research Institute of Industrial Economic.*

APPENDIX

Table 2: Impact of social network on formal social protection

Variables	(1) **OLS** Formal social protection	(2) **Probit** Formal social protection	(3) **First Stage** Social Network	(4) **IV Probit** Formal social protection
Social network	**0.0405***** **(0.0103)**	**0.275***** **(0.0643)**		**-1.395** **(1.187)**
Age	0.0112*** (0.00250)	0.113*** (0.0199)	-0.0137*** (0.00482)	0.0842*** (0.0292)
Age squared	-8.18e-05** (3.69e-05)	-0.00104*** (0.000265)	5.98e-05 (6.68e-05)	-0.000855*** (0.000309)
Married	-0.0663*** (0.00925)	-0.595*** (0.0862)	-0.159*** (0.0207)	-0.878*** (0.226)
Protestant	0.0186* (0.0109)	0.103 (0.0630)	-0.00507 (0.0183)	0.0797 (0.0713)
Primary	0.0484*** (0.00887)	0.727*** (0.183)	0.0144 (0.0304)	0.759*** (0.186)
Secondaryt	0.174*** (0.0160)	1.489*** (0.187)	0.0105 (0.0337)	1.565*** (0.195)
Secondaryg	0.0931*** (0.0114)	1.120*** (0.188)	-0.00641 (0.0317)	1.147*** (0.189)
Highe	0.495*** (0.0258)	2.359*** (0.190)	-0.104*** (0.0343)	2.346*** (0.191)
Household size			0.00503** (0.00233)	
Fathst			0.0310 (0.0468)	
Constant	-0.269*** (0.0395)	-4.997*** (0.395)	0.809*** (0.0855)	-3.546*** (1.107)
Observations	3917	3917	3171	3917
R-squared	0.227		0.078	
Prob>F	[0.000]			
Prob>Chi2		[0.000]		[0.000]
Cragg-Donald Wald F-stat				15.17

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. **Primary, secondary, secondary, highe** and **fathst** are respectively primary education, secondary technical education, secondary general education, high education and a binary variable which takes value 1 if the father of the worker is senior executive and 0 otherwise. The Cragg-Donald Wald F-statistics of weak identification test is compared to the Stock-Yogo weak ID test critical values [16.38 (10%); 8.96 (15%); 6.66 (20%); 5.53 (25%)

Table 3: Impact of Social network on informal social protection

Variables	(1) OLS Informal social protection	(2) Tobit Informal social protection	(3) First stage Social network	(4) IV Tobit Informal social protection
Social network	**-0.00566**	**0.00642**		**6.924*****
	(0.0189)	**(0.0548)**		**(2.295)**
Age	-0.0141**	-0.0701***	-0.0160***	0.0563
	(0.00580)	(0.0146)	(0.00401)	(0.0528)
Age squared	0.000177**	0.000946***	8.66e-05	0.000120
	(7.78e-05)	(0.000203)	(5.50e-05)	(0.000525)
Married	-0.0696***	-0.185***	-0.163***	0.887**
	(0.0146)	(0.0686)	(0.0174)	(0.383)
Protestant	0.0251	0.0391	0.000633	0.0373
	(0.0211)	(0.0565)	(0.0155)	(0.123)
Primary	-0.0339	0.0664	0.0230	-0.124
	(0.0246)	(0.0940)	(0.0254)	(0.208)
Secondaryt	0.0152	0.212**	0.0436	-0.100
	(0.0313)	(0.105)	(0.0286)	(0.246)
Secondaryg	0.000254	0.207**	0.0170	0.102
	(0.0299)	(0.0988)	(0.0268)	(0.213)
Highe	-0.0151	0.158	-0.0891***	0.793**
	(0.0394)	(0.110)	(0.0289)	(0.312)
Household size			0.00619***	
			(0.00195)	
Constant	0.399***	0.0859	0.829***	-6.134***
	(0.103)	(0.253)	(0.0717)	(2.128)
Observations	4387	4387	4422	4387
R-squared	0.007		0.084	
Prob>F	[0.000]		[0.000]	
Prob>Chi2	[0.000]		[0.000]	
Cragg-Donald Wald F-stat				11.34

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. **Primary, secondary, secondary, highe** and **fathst** are respectively primary education, secondary technical education, secondary general education, high education. The Cragg-Donald Wald F-statistics of weak identification test is compared to the Stock-Yogo weak ID test critical values [16.38 (10%); 8.96 (15%); 6.66 (20%); 5.53 (25%)].

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Table 4: Relationship between formal social protection and informal social protection

Variables	(1) IV Probit Formal social protection	(2) IV Tobit Informal social protection
Social network	**-1.547**	**5.143***
	(1.145)	**(1.450)**
Informal social protection	**-0.210****	
	(0.0925)	
Formal social protection		**-0.838***
		(0.223)
Age	0.0751**	0.0418
	(0.0294)	(0.0382)
Age squared	-0.000758**	0.000139
	(0.000314)	(0.000410)
Maried	-0.908***	0.665**
	(0.220)	(0.262)
Protestant	0.0796	0.0997
	(0.0721)	(0.105)
Primary	0.763***	-0.00439
	(0.188)	(0.159)
Secondaryt	1.579***	0.124
	(0.197)	(0.184)
Secondaryg	1.157***	0.203
	(0.191)	(0.169)
Highe	2.349***	0.557**
	(0.193)	(0.237)
Constant	-3.274***	-4.740***
	(1.082)	(1.399)
Observations	3882	3882
Prob>Chi2	[0.000]	[0.000]
Cragg-Donald Wald F-stat	16.74	17.34

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. **Primary, secondary, secondary, highe** are respectively primary education, secondary technical education, secondary general education, high education. The Cragg-Donald Wald F-statistics of weak identification test is compared to the Stock-Yogo weak ID test critical values [16.38 (10%); 8.96 (15%); 6.66 (20%); 5.53 (25%)]