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Sibling social networks and labor market outcomes in Niger: are there any spillover effects?

Mathias KUEPIE *

Michel TENIKUE **

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Contact at AFD: Mathias KUEPIE (kuepiem@afd.fr)

* Mathias Kuépié, Researcher at Agence Française de Développement, 5, rue Roland Barthes, 75012 Paris and associated Researcher at UMR DIAL - IRD – Paris Dauphine.

** Michel Tenikue, Researcher at LISER, Luxembourg Institute of Socio-Economic Research, LISER - 11, Porte des Sciences | L-4366 Esch/Alzette.

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Sibling social networks and labor market outcomes in Niger: are there any spillover effects ?

Mathias Kuépié (corresponding author), Researcher at Agence Française de Développement - 5, rue Roland Barthes, 75012 Paris, email: kuepiem@afd.fr and associated Researcher at UMR DIAL-IRD-Paris Dauphine
Michel Tenikue, Researcher at LISER, Luxembourg Institute of Socio-Economic Research - LISER - 11, Porte des Sciences | L-4366 Esch/Alzette

Abstract

In this study, based on the Niger 2012 labor force survey, we assess the importance of the effect of siblings on Niger labor market integration and the potential heterogeneity of this effect. Our main result is that there is a sibling network spillover effect: for any given individual, having elder siblings in a given sector of activity increases his own probability of also integrating that sector. For those in particular whose siblings are in profitable public or private sectors, this means that they have additional chances to integrate these coveted sectors. We also show that siblings' network is gender sensitive: its effect is maximal when both siblings are of the same gender. Another important result which emerges from this study is that siblings' network acts as a substitute in case of poor human capital or family background resources.

Key words: Social Network, family Network, Sibship, Labor Market, Niger

JEL Classification: D85, F14, L14, R11.

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Introduction

The analysis of the link between social networks and labor markets is giving rise to increasing interest by researchers. The reason is that, unlike the neoclassical theory, the labor market does not work perfectly. Particularly (but not only) in developing countries with weak institutions, the labor market faces problems of information circulation and reliability, failure of regulation tools: contract enforcement, credit availability, etc. In this configuration, resorting to social network can help overcome labor market constraints and imperfections (Granovetter, 2005; Montgomery, 1991; Goyal, 2006; Fafchamp and Minten, 2002; Fafchamp, 2006; etc.). The social network can be understood as a set of links between individuals involving a certain degree of trust, identity, etc. among members (Bourdieu, 1986, Putman, 1999). But it can also be a set of weak ties, in the sense of Granovetter (1973). Whatever form it takes, what is important for a social network is its effectiveness in enabling individuals to achieve their goals. Usually, studies on the effect of social network on labor market outcomes consider friendship network, professional network and community (clanic, ethnic, persons coming from the same locality or the same country, etc.) networks. Hence, many studies have pointed out the role of community networks on labor market integration of their members (Munshi, 2014; Fafchamp and Minten, 2002; Munshi, 2003). Others have insisted on friendship networks (Capellari and Tatsiramos, 2015) or professional ones (Kramarz and Thesmar, 2013 Akoten and Otsuka 2007). Concerning sibling networks, studies are oriented toward competition for parental resources (Lawson & Mace, 2009; Lee, 2014) or mutual support and caregiving in the framework family solidarity (cf. Gillies & Lucey, 2006; Voorpostel, M.B.J., 2007). But as far as the labor market is concerned, very few studies have examined the role of sibling support in labor market achievement, at least in the framework of network theory (to our knowledge, the only noticeable exception is the work of Nordman and Pasquier-Doumer (2015) on Burkina Faso). On the contrary, numerous studies have instead focused on the link between parents' characteristics and the socioeconomic performance of their children, including the issue of intergenerational mobility (Coleman, 1988; Bourdieu, 1984; Kramarz & Skans, 2014; Thelot, 1982; Peugny, 2013).

If this lack of studies is somewhat understandable in the context of developed countries where mean sibship size is less than 2 brothers and sisters, the situation is very different in the context of developing countries in the first stage of demographic transition, characterized by a reduction of mortality but maintaining a high fertility level. In addition, polygamy also contributes to the increase in number of brothers and sisters. In this configuration, the size of sibship is far from being negligible (more than 5 in the case of Niger). So we can consider siblings like a community network of people brought up by the same parents. The ties between members are necessarily stronger than in any other form of community network (even though in some cases rivalry can take precedence over cooperation). How this special network is effective in helping its members (siblings) to access better position in the labor market is an important and open question in the settings of sub-Saharan Africa. This issue of labor market integration induced by brothers and sisters is also important since for the larger-scale networks, some authors have shown that they can, in certain conditions, enhance intra-generation social mobility and hence reduce inequalities (Munshi, 2014). If we can show that, free of parents' characteristics, adult siblings can be the

engine of each other's labor market integration, it will shed light on a new mechanism of social mobility with important consequences on the evolution of inequalities.

Our study is also important from a methodological point of view: when an individual's network is formed by all persons he knows or groups he belongs to, there is a clear self-selection problem since each person usually chooses his acquaintances, so identifying the actual impact of this kind of social network on labor market outcomes is not easy. Being a member of a sibship is not subject this kind of self-selection since nobody chooses his siblings. In spite the absence of self-selection, the sibling network effect can still be hard to identify in case of the existence of a common factor drawing all siblings toward same labor market status. This shortcoming is extensively discussed in the methodological part of this study.

Another reason that this study is important is the fact that it concerns Niger, one of the poorest countries in world, whose labor market (like that of most sub-Saharan Africa countries) performs very poorly: according to the population census of 2012, only 4.6% of the labor force are wage workers (2.8 in the public sector and 1.8 in the private one). Given this tiny share of formal jobs, one can imagine that competition will be fierce among workers. If this competition were perfect, the most "able" would be the winners. But given the imperfections we mentioned above, individual networks may play an important role, especially the sibling network, since siblings may have strong concern about the achievement of one another. In this study, based on the Niger 2012 Labor force survey, we assess the importance of the effect of siblings on Niger labor market integration and the potential heterogeneity of this effect.

Our main result is that there are sibling network spillover effects: for any given individual, having elder siblings in a given sector of activity increases his own probability of also integrating that sector. For those in particular whose siblings are in the fruitful public or private sectors, this means that they have additional chances to integrate these coveted sectors. We also show that a sibling network is gender sensitive: its effect is maximal when the siblings are of the same gender. Another important result which emerges from this study is that sibling networks act as substitutes in case of poor human capital or family background resources.

The remainder of this study is organized as following: in the first section, we provide a survey of the literature review on the effect of social network on labor market outcomes. The second section is dedicated to the data and the econometric methods. The third part presents the results, and the last part concludes..

I. Literature review.

As we stated in the introduction, to the best of our knowledge, there is very little specific literature dealing with the effect of sibling networks on labor market outcomes. To imagine what it could be, one should rely on the general literature review of other forms of social

networks on labor market integration. A certain number of studies have dealt with this issue, both in terms of theoretical and empirical perspectives.

On the theoretical side, we can mention the work of Goyal (2007) who developed models to predict the impact of social networks on labor market outcomes: exit from unemployment and earnings. On the first aspect, his model leads to the result that employment status of individuals belonging to the same social network are positively correlated because when a member has a job, the next information on employment opportunity he receives is sent to the unemployed members of his network. So the more individuals employed in a social network, the more chance a given member will have to be in his turn employed. This also means that those who are not embedded in a network with employed members will have significant difficulties obtaining a job.

As concerns earnings, Goyal (2007) argues that during the hiring process, employers face asymmetric information on the actual ability of the workers. Even though applicants can exhibit some signals like diplomas, they are not sufficient to correctly determining ex ante their productivity. According to Goyal's model, firms that hire via a referral system will have a higher probability to recruit workers with higher abilities and these workers will receive a wage premium. The underlying mechanism is the same as Montgomery's (1991) model: firms ask to their high-skilled employees to recommend new ones as productive as them, and knowing that they will be more productive, firms are willing to pay more for these new employees, who in turn, will increase the firm's profit. But why should high-skilled workers recommend only other high-skilled workers to the firm? According to Montgomery and Goyal's model, it is because of "inbreeding" in the social network: it is more probable that high-skilled workers will be in social relationships with other high-skilled persons than be in relationships with less able persons. But other authors suggest additional mechanisms, like sanction if an employee refers someone with low ability or the loss of reputation. Otherwise the temptation can be very strong for employees already in the firm to recommend some of their friends or relatives, irrespective of their skill (Health, 2013, Dhillon et al, 2013).

There are numerous studies supporting the evidence that being socially connected helps in finding a job or in strengthening one's position once in the labor market. We can quote Munshi (2003), who has assessed the impact of Mexicans' network size on Mexican labor market outcomes in USA, using as an instrument of network size the shift in the level of rainfall in Mexico, and controlling for the time individual fixed effect. His results show that exogenous increase in network size raises the probability of being employed and of gaining higher wages in US labor market. If Munshi's study considers a large community network, others focus on very narrow social networks, with strong ties between members. It is the case of Cappellari and Tatsiramos (2015) who, using the British Panel Data survey, analyze the impact of close friendship network (the three most important friends) on own labor market status. Given the panel nature of their data and the existence of predetermined variables, they are able to control for friend's network endogeneity and self-selection issues. Their estimates show that being connected to friends who are employed increases own transition from non-employment to employment, in line with Goyal's (2007) predictions. Kramarz and Skans (2014) also focus on a

narrower definition of network, namely the node formed by a father and his adult child. They analyze the impact of the presence of the father in a plant (production unit) on the probability of the child holding his first job in the same plant in Sweden. Using classmate fixed effect model, they show that having his father in a plant increases the probability of a child landing his first job in the same enterprise, especially when the child has a low education level. But they also reveal that finding a job via father's channel has a cost in term of low wage for the incumbent. In this case, contrary to Montgomery (1991) and Goyal's (2007) theoretical assertion, being hired through a referral system seems not to be a signal of high productivity but rather a sort of nepotism. The only work addressing the issue of job search through family ties in the Africa context is the article of Nordman and Pasquier-Doumer (2015). These authors, using first-hand biographical data, highlight the role of family networks on professional mobility in Ouagadougou (Burkina Faso). Network is measured by the number and the socioeconomic status of siblings. Their estimations show that whereas the network size does not determine professional mobility, the network quality (resource embedded in it) favors professional immobility, maybe by helping individuals reinforce their position in their current job.

While the above-mentioned studies analyze influence of social network on individuals' employment in the labor market, others are more focused on particular industries. One important study using that approach is the one conducted by Fafchamp and Minten (2002). Based on data on Madagascar, they assess the economic performance of traders' networks, taking into account the possible endogeneity of network indicators. The latter are measured by the number of contacts a trader has with other traders, suppliers and clients. Their estimations show that these variables positively influence traders' economic performance, even after controlling for endogeneity and other econometric shortcomings. They demonstrate that the main channel through which social network affects traders' profits are better information on prices, the trustfulness of clients and suppliers, and the possibility to lend and to borrow. In the same vein, Akoten and Otsuka (2007) in the case of Kenya, show that micro-businessmen who have developed links with peers are more prone to adopt new technologies and to produce higher quality products than those who are isolated and are only in relationship with consumers. Similar findings were reported by Ishiwata et al. (2014) in Ethiopia, where they showed that the density of ties between micro-enterprises positively affect sales. Kuépié, Tenikue and Walther (2015), in a multiple West African country study, show that the effect of network on economic performance of traders depends on the type of network. Measuring the type of social network by socio-professional category of the network members and controlling for endogeneity using father's education level and ethnicity as instruments, they find that being in connection with religious leaders has a negative effect on the business profit, while relationship with civil servants, politicians, and, security officers tends to positively affect economic performance. This study clearly shows that the type of influence the network exerts on economic outcome depends upon the type of "node" and hence measuring the influence of the overall network may not be very accurate.

Finally, this literature review shows that the modus operandus of social networks in the labor market is diverse. But beyond this apparent diversity, two key elements determine the efficiency

of social networks in helping individuals integrating or strengthening their position in labor market: (i) the quantity of suitable information the network can provide, and (ii) the ability of a given individual to access and to use this information. The quantity of suitable information is a function of the socio-economic characteristics of the network as Kuépié, Tenikue and Walther (2015) or Nordman and Pasquier-Doumer (2015) explicitly highlight. In the case where a network's members are homogenous, the network size is also an important factor of the quantity of suitable information (Goyal, 2007). The ability to access and to use the information depends upon the strength of the tie with network member, as is the case in Kramarz and Skans (2014). In the case of siblings, there is no doubt that ties will be stronger than in other types of networks and our objective in this study is to assess to what extent siblings succeed in helping each other in the labor market. In this study, we provide new empirical evidence on the role of siblings' networks in Niger as Nordman and Pasquier-Doumer (2015) did on Burkina Faso. But we also improve on this paper by examining the heterogeneity of the network effect along two dimensions: gender and parental socioeconomic status.

II. Data, variables and methods.

2.1. Data

Data come from the Niger 2012 Labor force survey. This survey covers 5795 households and 30442 individuals. There was a special module on social networks intended for individuals aged 20 years and above (12162). The main objective of this module was to measure the size and the characteristics of family member networks. It included ten sections, enabling the identification of the size of the network, its activation in different circumstances (employment, education, other difficulties), and characteristics of its members (age, gender, relationship with the interviewee, place of residence, education, employment status and category). These characteristics were collected in two tables. The first, specially focused on close family members, was formulated as follows: "List the siblings living in the household and those not living in the household. For those living in the household: only ask the question on the link with father / mother and specify the order number from the household roster. For those not living in the household, ask all the questions in the table... ". So this table clearly captures all siblings, whatever their degree of interaction with the interviewee. The second table, intended to register the characteristics of other network members, was introduced as follows: "Apart from your brothers and sisters, think of other people with whom you interact (uncles, aunts, cousins, nephews, neighbors, etc. ...). The contacts should not be necessarily regular but they must exist...". Persons listed in this second table are clearly selected by the interviewee, depending on his own feeling and on the intensity of interactions between them.

If we divide an individual's network into two components, siblings and non-siblings, it is clear from our survey design that the first part is exhaustive whereas the second depends on individual choice. Data exploration confirms this hypothesis: the average size of sibship is 4.8 persons while the average size of other network members (parents and spouse excluded) listed by

interviewees is only 1.6 persons. So even if we were interested in the effect of the overall network effect on labor market outcomes, it would be very difficult to measure it using our data. This is a methodological reason why we restrict the scope of this study on sibling network. Our analysis file is built with the sibling table to which we added the interviewee to have the complete sibship network. We then merged the complete sibship network file with parents' socioeconomics features (principally education and employment characteristics). The final file includes 59919 cases. But given that we are mainly interested in siblings in the working age group (20-59), the useful cases are 44552, which leads to an average adult sibship size of 3.7 persons. We provide more descriptive statistics on siblings' characteristics in section 4.

2.2. Data

2.2.1. Dependent variable.

Our main variable of interest is the employment type (or professional status) in the labor market, coded in four positions: public employment, private employment, self-employment and unemployment/agriculture. We merged agriculture and unemployment after many attempts which showed that the individuals belonging to the two categories behave similarly. It's also theoretically justified by the fact that in many African countries including Niger, the productivity of agriculture is very low and people work in agriculture by default. This is especially true in rural areas.

2.2.2. Main explanatory variables

Our main explanatory variable is the elder siblings' professional status, with exactly the same categories (public employment, private employment, self-employment and unemployment/agriculture) as for the dependent variable. Given that an individual can have more than one elder sibling in each status, we created a set of four siblings' employment status dummy variables taking the value one if the individual has at least an elder brother or sister in the considered professional status and zero otherwise. We also consider the number of siblings in each professional status in an alternative specification.

2.2.3. Control variables.

In this study, we use two types of control variables: those related to parents and those related to individuals.

Parental variables. The parental variables are very important because they enable us to control for initial conditions, and to expurgate the siblings' influence from other family circumstances. We use parental professional status and parental education. Parental professional status is measured exactly as the individual's, with a set of dummy variables equal to one for category j if at least one of the parents has employment status j, and zero otherwise. The second parental

variable is the parents' education level. We built one dummy variable equal to one if parents had a high education level (high school or university) and zero otherwise.

Individual variables. The most important individual control variable is education level, since it is a measure of human capital which is the main determinant of labor market integration per se. In addition to its own effect, controlling for an individual's education level also contributes to controlling from initial family circumstances since education depends, at least partly, on family background.

Other individual variables are age birth order and gender. Age is not only a demographic characteristic but can also be considered, in the absence of job seniority, as an indicator of work experience. Birth order is a measure of the position in the sibship. As concerns gender, we use it as a simple control variable or in interaction with siblings' professional status, in other to isolate any potential gender-specific pattern.

The last control variable is the place of residence, which enable controlling for the possible correlation between sibling network and local labor market conditions. So we can consider that our estimations are place of residence fixed effects models.

2.3. Econometric methods

Let L_{ij} be the labor market status of an individual i

$$L_{ij} = \begin{cases} 1 & if\ the\ individual\ works\ in\ the\ public\ sector \\ 2 & if\ the\ individual\ works\ in\ the\ private\ sector \\ 3 & if\ the\ individual\ is\ self\ employed \\ 4\ if\ individual\ has\ no\ job\ or\ is\ in\ the\ agricultural\ sector \end{cases}$$

Let associate to each category L_{ij} one latent variable L_{ij}^{*} (j=1,2,3,4) indicating the propensity to be in the sector j

Let first consider the following system of equations

$$L_{ij}^{*} = \alpha_j S_i' + \beta_j X_i' + \varepsilon_{ij} \text{ ,j=1,2,3,4 (EQ1)}$$

$$(\varepsilon_{i1}, \varepsilon_{i2}, \varepsilon_{i3}, \varepsilon_{i4}) \sim N(0, \Sigma)$$

Where:

$N(0, \Sigma)$ is a multivariate normal distribution

S_i is the vector of siblings characteristics, particularly the set of labor market sector (same as L_{ij}) occupied by siblings.

The parameter of interest is vector α_j, which can be estimated without bias if and only if Si is uncorrelated with the error term ε_{ij}, otherwise S_i would be endogenous. In EQ1, this is certainly the case since siblings share the same family backgrounds and hence their characteristics depend on those of their family of origin. Numerous studies (Thelot, 1982; Peugny, 2013, Kuépié and Nouetagni, 2012) have indeed shown that "like the father, like the son", in other words that the professional situation of children is determined by the father's. So one simple way to control the

bias on α_j is to include in the equations (1) family background and to estimate an augmented set of regressions

$$L^*_{ifj} = \alpha_j S'_{if} + \beta_j X'_{if} + \gamma_j F'_{if} + \omega_{ifj}$$;j=1,2,3,4 (EQ2)

In this study, Ff is parental education and professional status. These two variables are coded similarly to siblings', hence we can directly compare the parental and the siblings' effects.

EQ2 leads to an unbiased estimation of αj if most of the correlation between ε and X is driven by parents' socioeconomic characteristics and hence, that is:

$$E[S_{if} / (F_{if}, X_{if}); \quad \omega_{ifj}]=0$$ (EQ3)

So our main identifying assumption is that EQ3 is true. This equation is not per se testable and someone could still argue that the parents' and the siblings' labor market performance are driven for example by an observed factor U_f which pushes L_{if}, Sif and F_f in the same direction. U_f could be seen as an intergenerational "ability" factor, which shifts all the family members (parents, siblings) into specific positions (top or low positions) in the labor market. That is, by nature some families are more able than others. If this unobserved factor is an important driver of labor market integration, then our estimation will still suffer from the simultaneous bias. To check the importance of this kind of bias we estimate separate models of siblings from privileged family background (those whose parents were in public or private sector or who had a high education level (high school or university); group I) and from disadvantaged family background (those whose parents did not work in public or private sector and did not attain the high school; group II). Under the hypothesis that U_f really does exist, its value should be higher in group I than in group II. So we should expect the siblings' effect to be greater in the first group than in the second. We show that this is not the case since in the absence of parental resources (so no intergenerational ability), siblings' effect still influences individual's labor market position with an intensity greater than in privileged families. Even if it is not sufficient proof of our estimates' consistency, it reinforces it.

III. Results.

In this section, we start by providing some descriptive statistics on siblings' network size and on Niger labor market (sub-section 1). In a second sub-section, we analyze the bivariate link between elder siblings' labor market status and that of younger siblings. The third sub-section is dedicated to multivariate analyses (estimation of EQ 2 and other variants). It deals with both the overall effects of siblings' network and their variation across gender and family socioeconomic status.

3.1. The scope and characteristics of siblings.

The average number of siblings in working age group (20-59) is 5.9 persons. But in this study, the focus is on the number elder brothers and sisters who could potentially ease access to a given professional status. To this end, for each individual we define the variable number of elder siblings which counts the numbers of siblings aged five years or more than the individual. The average number of elder siblings is 2.5 persons. 63% of individuals have at least one elder sibling, which corresponds to 28063 individuals.

About 8% of siblings are in the public sector and 4% in the modern private sector; 16% are self-employed in the non-agricultural informal sector; 19% in agriculture and 54% don't have a job. Disentangling the sample by gender helps understanding why 54% of 20-59 are not working. As women are concerned, 84% are out of the labor market, mainly because they are declared as housewives; 6% are in the public sector but only 1% in the private sector and 6% are self-employed in the non-agricultural sector. Only 4% of women are declared in the agricultural sector. This underrepresentation of women in the agricultural sector is due to the fact that in rural areas they are declared as housewives rather than family workers (cf. Donahoe, 1999; Mata-Greenwood, 2000). With respect to men, they are 32% in the agricultural sector, 25% are self-employed in the non-agricultural sector, 7% in the private sector and 10% in the public sector. 25% have no job, especially because they are still students, for the youngest, or retired for the oldest.

Table 1 Sector of activity of siblings

	Male	Female	Total
Public sector	10.18	5.49	7.92
Formal private	7.0	1.2	4.2
informal self- employed	24.8	6.0	15.7
Agriculture	32.4	3.7	18.6
Not working/ND	25.6	83.6	53.6
Total	100.0	100.0	100.0
N	23029	21523	44552

Before further analysis of the interrelation between siblings' job position, it is important to clearly describe the characteristics of each type of job status in terms of earnings and working conditions. To this end, we use the principal module of the Niger labor force survey. Earnings and working conditions were only collected for the interviewees and not for their network members (which is understandable since it is difficult for somebody to accurately report on working conditions of someone else). But we can imagine that this working condition would on average be applicable to the network members, to the degree that they hold the same working status.

Table 2: earnings and working conditions in Niger labor market

Sector of activity	Median earning (FCFA)	Other working benefit	member of a professional union	numb er
Public sector	87000	57.1%	41.8%	909
Formal private	60000	14.0%	13.2%	623
Informal self employed	43500	2.8%	5.6%	1454
Agricuture	21750	1.3%	0.7%	459
ND	67200	4.0%	12.0%	25
Total	53000	18.8%	15.8%	3470

As concerns remuneration, individuals working in the public sector, with a median earning of 87000FCFA, are the most favored in the Niger labor market. They are followed by private sector workers (60000FCFA), while the self-employed only earn 43500 FCFA per month. Those in the agricultural sector who estimated their income (only about 20% of farmers did so) declared an amount equivalent to 21750FCFA per month. So this earning pattern confirms that those working in the public sector are best off, followed by those in the private sector and that the self-employed are the least favored among non-farm workers. Famers are far behind, even though it is not easy to estimate their income. Workers were asked if they were members of a trade union and if they benefited from housing and family allowance, paid leave and medical care. Whatever benefit is considered, the hierarchy from public workers to farmers is confirmed. 41% of public sector employees are member of a trade union, against 13% of those in the private sector and only 5% of the self-employed. As regards other working benefits, 55% of individuals in the public sector have at least one benefit among housing or family allowance, paid leave and medical care. This percentage is only 13% for private sector workers. Very few of the self-employed and famers have other advantages related to their activity.

From now, our aim is to measure how elder siblings' job positions influence that of younger siblings. Before discussing results of multivariate models, it is important to cast a glance on the bivariate relationships.

3.2. Correlation between siblings' job status

Table 3 shows that there is a strong link between sectors of activity of elder and younger siblings: while unconditioned proportions of siblings in the public sector is 8%, it is multiplied by more than 2 (19%) when an individual has at least one elder sibling already in this sector. There is also a positive link between having elder siblings in the public sector and working in the private sector, but the proportion increases "only" by 50% (from 4 to 6%). Having siblings in the public sector does not alter the proportion of self-employed in the non-agricultural sector. We saw above that 4% of individuals aged 20-59 are working in the private sector. This proportion is multiplied by about four (15.5%) when a person has an elder sibling in the same sector. Having

an elder sibling in the private sector also shifts the proportion of those working in the public sector upward (12% against 8% for those without siblings in the private sector). On contrary, it pulls the proportion of younger siblings working as self-employed downward (from 16% to 12%). In the self-employed sector, a similar matching is observed since those with an elder sibling in this sector are 25% to be also self-employed, against 16% for the overall population.

Table 3. Cross tabulation between younger and elder siblings' professional status

		Has at least an elder sibling in....			
	Overall	Public sector	Private formal sector	Self-employed sector	Agricultural sector/not employed
Public sector	7.9	18.8	11.5	6.3	5.8
Private formal sector	4.2	6.1	15.5	3.2	3.1
Informal self-employed sector	15.7	15.4	11.7	24.5	13.6
Agricuture/ND	72.2	59.8	61.4	66.0	77.6
Total	100.0	100.0	100.0	100.0	100.0
N	44552	5434	2777	9489	23939

To sum up, the bivariate analysis highlights a clear relationship between siblings' professional status. But that does not mean that elder siblings' professional positions influence that of younger siblings. Actually, this relationship could be driven entirely by parental backgrounds. So to go further into the analysis, it is important to turn now to multivariate analysis.

3.3. Multivariate analysis.

In this section, we estimate several variants of equation 2 to assess the influence of elder siblings' professional status one younger sibling's. The first model sets the scene: it discusses the overall siblings' effect and the scope of such effect. We also analyze the influence of competitive factors on siblings' network (human capital and family backgrounds). In a second step, we disentangle siblings' network in brotherhoods and sisterhoods, with the objective of assessing if the sisterhood's network is as effective as brotherhood's. We then turn to the analysis of the interaction of network characteristics with the competitive factors: human capital and family background. In other words, we seek to know if the effect of network varies according to human capital endowment and family background respectively. As we said in the methodological section, this interaction analysis also serves as a robustness check. In all models we address the issue of potential gender discrimination in the activation of the family network. In all the analyses, the gender dimension is taken into account through separate models for males and females.

3.3.1. The overall siblings' effect.

The main result coming out of table 4 is that having at least an elder sibling in a given sector maximizes the probability of also having a job in that sector, after controlling for family background and individual's education level. So there is a sort of siblings same sector "dependency network". More specifically, having siblings in the public sector, most increases the probability of also being in that sector (compared to any other), then the private and lastly the self-employed sector. In the same vein, having siblings in the private sector increases likelihood of entering into the private sector then the public sector, and decreases the probability of entering into the self-employed sector, compared to agricultural/Not employed. Having siblings in the self-employed sector first increases the probability of entering into that sector, then the public sector and does not increase the probability of entering into the private sector. So it seems that private and independent sectors are mutually exclusive. These results clearly establish the existence of a professional assortative mating between siblings.

In a further specification, in addition to the dummy variables, we included the number of elder siblings in each professional status (cf. table A2 in appendix). By doing so, our objective is to estimate the size effect of each homogenous professional network. Results show that conditioned on having at least one elder sibling in a given sector, each additional elder sibling positively affects the probability of being in the considered sector. So we can conclude that in addition to the quality, the size of the elder siblings' social network is also valuable, as far as we consider elder siblings with the same professional status. This is a classical result in the network literature: the more an individual is connected, the more he can benefit from the network resource (cf. Goyal 2007).

3.3.2. Gender differences.

If we consider the siblings' professional status as a family resource, an interesting question to address is the following: is this valuable resource mobilized both for men and women? This question is important since many studies have highlighted gender inequalities in labor market at the expense of the women (Weichselbaumer & Winter-Ebmer (2005); Nicita & Razzaz (2003), Nordman, Robilliard and Roubaud, 2011, etc.). Others have also shown that as regards education, household resources are primary affected to men's human capital formation (cf. Kuépié & Misangumukini, 2012). So by examining the gender bias in the siblings network, our objective is to check whether gender inequality observed in other domains are expanded to the mobilization of siblings' resources.

The gender specific models show that sibling networks are effective both for men and for women (cf. table 4). So unlike many other household resources (differences in school investments, for example), elder sibling networks are equally useful for males and females on the labor market. We will go through the gender analysis by also disentangling the elder sibling composition by gender.

3.3.3. parental professional status.

One of the most competitive factors to siblings networks is parental backgrounds, which have been popularized in the framework of the theory of social reproduction: Bourdieu (1984); Thelot (1982), Peugny (2013). In this study, parental sectors of activity are coded exactly like siblings', so that we can compare the pattern of the two resources. Estimations confirm the well known result of parental transmission of social status. So, like siblings, having a parent in a given sector also increases the probability of integrating the same sector of activity. But surprisingly, the effect of parental professional network seems less strong than siblings'. We were expecting the opposite, since the theory of social reproduction stresses the importance of parental professional status as the main engine of social mobility. It clearly appears here that siblings' professional status plays a more important role. We will draw all the consequences of this new source of social mobility (or reproduction) after a deeper analysis of the interaction between parental and sibling professional status.

3.3.4. The role of education

Education is measured by a dummy variable that indicates whether an individual has completed at least higher secondary education. The effect of the education of an individual, his elder siblings and his parents are considered separately. The results show that only own education has a significant and positive effect on integrating the highest segments of the labor market, namely the public sector and to some extend the private sector (table 4). This positive effect of an individual's education level on his own labor market position is in line with the human capital theory, which states that investment in human capital improves the allocation into the more rewarding sector (cf. Kuépié and Nordman, 2015).

Although parents and siblings with a high level of education can also be considered a positive family resource, this resource does not by itself lead to the improvement of the labor market position of individuals. In fact, parents and siblings education effects are absorbed after the introduction of their professional status (results not shown)

Table 4. Influence of elder siblings' professional status on younger siblings' professional status (multivariate probit regression coefficients)

	Male and Female			Male			Female		
VARIABLES	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed
Elder sibling in public sector	0.668***	0.292***	0.167***	0.691***	0.282***	0.238***	0.680***	0.388***	0.028
	(0.062)	(0.068)	(0.055)	(0.082)	(0.082)	(0.073)	(0.086)	(0.120)	(0.092)
Elder sibling in private sector	0.130*	1.009***	-0.146**	0.111	1.128***	-0.157**	0.160	0.617***	-0.087
	(0.072)	(0.069)	(0.063)	(0.092)	(0.084)	(0.079)	(0.104)	(0.127)	(0.096)
Elder sibling self-employed	0.102**	0.082	0.731***	0.343***	0.221***	0.953***	-0.222***	-0.085	0.390***
	(0.051)	(0.055)	(0.036)	(0.063)	(0.066)	(0.047)	(0.081)	(0.105)	(0.057)
Elder sibling other status (agricultural sector not working)	-0.365***	-0.331***	-0.258***	-0.290***	-0.316***	-0.234***	-0.496***	-0.371***	-0.308***
	(0.045)	(0.047)	(0.038)	(0.054)	(0.055)	(0.044)	(0.071)	(0.091)	(0.068)
Elder sibling attained high school or university	0.053	-0.127*	-0.032	-0.045	-0.157*	-0.067	0.170*	-0.102	0.013
	(0.067)	(0.073)	(0.056)	(0.087)	(0.088)	(0.074)	(0.093)	(0.133)	(0.094)
Parents in public sector	0.466***	0.292***	0.118**	0.410***	0.317***	0.114*	0.535***	0.210*	0.103
	(0.058)	(0.062)	(0.052)	(0.071)	(0.075)	(0.067)	(0.084)	(0.109)	(0.086)
Parents in private sector	0.215**	0.598***	0.209***	0.143	0.664***	0.236**	0.347***	0.451***	0.180
	(0.084)	(0.084)	(0.075)	(0.106)	(0.106)	(0.100)	(0.119)	(0.144)	(0.118)
Parents self-employed	0.127**	0.157***	0.581***	0.236***	0.270***	0.729***	0.028	-0.023	0.372***
	(0.054)	(0.058)	(0.041)	(0.067)	(0.068)	(0.052)	(0.087)	(0.127)	(0.069)
Parents other status (agricultural sector not working)	-0.053	-0.062	0.022	-0.036	-0.077	0.017	-0.067	0.016	0.029
	(0.038)	(0.045)	(0.034)	(0.047)	(0.052)	(0.041)	(0.062)	(0.087)	(0.058)
Parents in attained high school or university	-0.154	0.079	-0.128	-0.272***	-0.214*	-0.228*	-0.082	0.469***	-0.091
	(0.095)	(0.105)	(0.091)	(0.105)	(0.118)	(0.119)	(0.141)	(0.146)	(0.124)
Age	0.033***	0.014***	0.018***	0.038***	0.014***	0.017***	0.026***	0.014***	0.021***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)
Attained high school or university	1.547***	0.101*	-0.841***	1.255***	-0.227***	-1.141***	2.016***	0.884***	-0.169
	(0.044)	(0.056)	(0.058)	(0.052)	(0.063)	(0.063)	(0.072)	(0.094)	(0.104)
Constant	-2.421***	-1.215***	-0.770***	-2.488***	-1.140***	-0.699***	-3.214***	-3.024***	-2.456***
	(0.088)	(0.094)	(0.071)	(0.109)	(0.104)	(0.086)	(0.130)	(0.191)	(0.114)
Observations	43,960	43,960	43,960	22,695	22,695	22,695	21,265	21,265	21,265

Robust standard errors in parentheses ;*** p<0.01, ** p<0.05, * p<0.1; *N.B: the following variables are also included in the regression: Birth order; Female (for both gender sex model);Lives in a small town; Lives in rural area; Lives in abroad*

3.3.5. Effectiveness of elder sisters' and elder brothers' professional status.

In the previous models, we pooled sisters and brothers together, supposing that the effect of siblings' networks is homogeneous according to the gender of the elders. We relax this hypothesis here by considering elder brothers and elder sisters separately. Estimations (table 5) show that both the presences of sisters and brothers in a given sector are effective in channeling younger siblings into that sector. We even observe that for the public, elder sisters are slightly more effective than elder brothers. But the reverse occurs for the private and self-employed sectors.

When disentangling models by gender, the comparison of the coefficients pattern shows that a man has more chance of integrating a given sector when he has an elder brother in that sector than when he has an elder sister there. Similarly a woman has more chance of integrating a given sector when she has an elder sister in that sector than when she has an elder brother there. So there is a sort of same-gender preference reflecting, at least partially, competition between brothers and sisters.

Table 5. Influence of elder brothers and elder sisters' professional status on younger siblings' professional status (multivariate probit regression coefficients)

	Male and Female			Male			Female		
VARIABLES	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed
Elder brother in public sector	0.516***	0.283***	0.127**	0.635***	0.369***	0.269***	0.390***	0.169	-0.129
	(0.068)	(0.075)	(0.058)	(0.091)	(0.090)	(0.079)	(0.099)	(0.134)	(0.093)
Elder sister in public sector	0.627***	0.339***	0.138	0.453***	0.170	-0.034	0.814***	0.584***	0.361***
	(0.095)	(0.103)	(0.084)	(0.118)	(0.122)	(0.103)	(0.129)	(0.169)	(0.136)
Elder brother in private sector	0.105	0.958***	-0.224***	0.105	1.134***	-0.205**	0.126	0.429***	-0.216**
	(0.075)	(0.072)	(0.065)	(0.098)	(0.087)	(0.084)	(0.108)	(0.140)	(0.104)
Elder sister in private sector	-0.125	0.664***	0.099	-0.198	0.498**	-0.074	-0.061	0.823***	0.337
	(0.165)	(0.173)	(0.163)	(0.213)	(0.203)	(0.186)	(0.226)	(0.253)	(0.219)
Elder brother self employed	0.071	-0.002	0.655***	0.321***	0.157**	0.943***	-0.233***	-0.144	0.198***
	(0.054)	(0.059)	(0.037)	(0.068)	(0.070)	(0.049)	(0.085)	(0.114)	(0.062)
Elder sister self employed	0.105	0.251***	0.542***	0.100	0.127	0.272***	0.013	0.346**	0.936***
	(0.078)	(0.091)	(0.068)	(0.095)	(0.109)	(0.086)	(0.133)	(0.157)	(0.086)
Elder brother other status (agricultural sector not working)	-0.364***	-0.405***	-0.393***	-0.366***	-0.452***	-0.477***	-0.399***	-0.338***	-0.221***
	(0.048)	(0.053)	(0.038)	(0.059)	(0.059)	(0.046)	(0.077)	(0.114)	(0.064)
Elder sister other status (agricultural sector not working)	-0.164***	-0.080	-0.101***	-0.056	0.000	-0.039	-0.336***	-0.271**	-0.199***
	(0.044)	(0.050)	(0.037)	(0.054)	(0.058)	(0.045)	(0.072)	(0.107)	(0.064)
Elder sister attained high school or university	0.082	-0.062	0.014	-0.027	-0.132	-0.035	0.236**	0.097	0.111
	(0.074)	(0.082)	(0.060)	(0.097)	(0.098)	(0.082)	(0.102)	(0.139)	(0.096)
Elder sister attained high school or university	-0.333***	-0.414***	-0.213**	-0.325***	-0.377***	-0.222**	-0.382***	-0.508**	-0.194
	(0.104)	(0.109)	(0.090)	(0.126)	(0.127)	(0.108)	(0.146)	(0.208)	(0.150)
Constant	-2.427***	-1.249***	-0.799***	-2.496***	-1.189***	-0.741***	-3.223***	-3.024***	-2.472***
	(0.088)	(0.093)	(0.070)	(0.108)	(0.103)	(0.085)	(0.130)	(0.183)	(0.111)
Observations	43,960	43,960	43,960	22,695	22,695	22,695	21,265	21,265	21,265
Pseudo R-squared	.	.	.	.	.	.	.	.	.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
N.B: the following variables are also included in the regression: Birth order; Female (for both gender sex model); Lives in a small town; Lives in rural area; Lives in abroad and age

3.3.6. *Interaction between siblings' professional status and parental socio-economic background*

Up to now, we implicitly supposed that the influence of siblings' network was the same across family background. In order to formally test this hypothesis, we create a variable indicating whether an individual is from a low social class (parents' professional status is neither public nor private sector and parents did not reach higher secondary education) or from a high social class (parents professional status is public or private sector or parents reached higher secondary education). The sibling network is effective both for persons from families with privileged backgrounds and for those from disadvantaged backgrounds. The siblings' resources seem to be more mobilized when individuals are from low socioeconomic backgrounds.

Table 6. Influence of elder siblings' professional status on younger siblings' professional status by social origin (multivariate probit regression coefficients)

	From high social class			From low social class		
VARIABLES	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed
Elder sibling in public sector	0.541***	0.258**	0.271***	0.750***	0.284***	0.102
	(0.097)	(0.114)	(0.104)	(0.078)	(0.083)	(0.065)
Elder sibling in private sector	0.064	0.978***	0.004	0.210**	1.076***	-0.166**
	(0.109)	(0.108)	(0.110)	(0.086)	(0.087)	(0.076)
Elder sibling self employed	-0.132	-0.061	0.487***	0.168***	0.124*	0.828***
	(0.090)	(0.100)	(0.092)	(0.059)	(0.067)	(0.039)
Elder sibling other status (agricultural sector not working)	-0.502***	-0.333***	-0.198**	-0.316***	-0.333***	-0.305***
	(0.089)	(0.092)	(0.085)	(0.051)	(0.055)	(0.042)
Elder sister attained high school or university	-0.006	-0.246**	0.011	0.130	-0.015	-0.018
	(0.097)	(0.109)	(0.102)	(0.084)	(0.092)	(0.066)
Age	0.053***	0.036***	0.031***	0.029***	0.008***	0.013***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)
Attained high school or university	1.213***	0.064	-0.886***	1.718***	0.115	-0.804***
	(0.073)	(0.091)	(0.097)	(0.053)	(0.071)	(0.070)
Constant	-2.722***	-1.649***	-1.069***	-2.255***	-0.944***	-0.429***
	(0.174)	(0.193)	(0.170)	(0.094)	(0.098)	(0.073)
Observations	6,508	6,508	6,508	37,452	37,452	37,452

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

N.B: the following variables are also included in the regression: Birth order; Female (for both gender sex model); Lives in a small town; Lives in rural area; Lives in abroad

In order to more systematically test the interactions between parents' status positions and siblings', we develop a partial interaction model by modifying (EQ2) as follows:

$$L^*_{ifj} = \alpha_j S'_{if} + \beta_j X'_{if} + \gamma_j Fi'_f + \delta D\left(S'_{if}, F'_{if}\right) + \omega_{ifj} \text{ ;j=1,2,3,4 (EQ4')},$$

where $D\left(S'_{if}, F'_{if}\right)$ is the vector of the diagonal elements of $S'_{if} * F_f$. In other words, we only identify interactions where father and siblings have the same professional status. Estimations (cf. table 7) confirm that the effect of sibship network is more effective when an individual cannot rely on his parental resources. All the interaction terms between the

professional sector of the parents and that of the elder siblings are negative and significant. So when the parents are in the same sector as the elder siblings, the latter influence is reduced. But it still positive since the main effect is always positive and largely greater than the interaction term in magnitude.

Table 7. Partial interaction between elder siblings' professional status and parental professional status on younger siblings' professional status (multivariate probit regression coefficients)

VARIABLES	Both sex Public sector	Private sector	Self employed	Male Public sector	Private sector	Self employed	Female Public sector	Private sector	Self employed
Elder siblings in public sector	0.791***	0.286***	0.147**	0.804***	0.278***	0.203**	0.846***	0.382***	0.045
	(0.068)	(0.077)	(0.060)	(0.088)	(0.092)	(0.079)	(0.093)	(0.142)	(0.100)
Elder siblings in public sector # parents in public sector	-0.455***	0.016	0.081	-0.439***	0.026	0.155	-0.550***	-0.042	-0.082
	(0.110)	(0.128)	(0.100)	(0.139)	(0.155)	(0.136)	(0.146)	(0.210)	(0.160)
Elder siblings in private sector	0.198***	1.075***	-0.155**	0.181*	1.191***	-0.180**	0.220**	0.671***	-0.071
	(0.074)	(0.073)	(0.067)	(0.095)	(0.088)	(0.083)	(0.105)	(0.138)	(0.101)
Elder siblings in private sector # parents in private sector	-0.446**	-0.398**	0.154	-0.459	-0.318	0.294	-0.390	-0.398	-0.092
	(0.200)	(0.198)	(0.179)	(0.281)	(0.240)	(0.238)	(0.313)	(0.332)	(0.294)
Elder siblings self employed	0.119**	0.061	0.815***	0.376***	0.191***	1.040***	-0.252***	-0.106	0.430***
	(0.055)	(0.061)	(0.040)	(0.067)	(0.072)	(0.051)	(0.089)	(0.111)	(0.065)
Elder siblings self employed# parents self employed	-0.125	0.059	-0.374***	-0.213	0.075	-0.422***	0.093	0.062	-0.177
	(0.102)	(0.117)	(0.081)	(0.133)	(0.143)	(0.106)	(0.161)	(0.261)	(0.128)
Elder siblings other status (agricultural sector not working)	-0.388***	-0.389***	-0.289***	-0.312***	-0.430***	-0.294***	-0.522***	-0.295**	-0.296***
	(0.063)	(0.069)	(0.052)	(0.079)	(0.082)	(0.064)	(0.096)	(0.131)	(0.092)
Elder siblings other status (agricultural sector not working)# parents other status	0.038	0.102	0.047	0.033	0.190**	0.091	0.048	-0.125	-0.019
	(0.069)	(0.078)	(0.057)	(0.086)	(0.091)	(0.069)	(0.110)	(0.161)	(0.099)
Elder siblings attained high school or university	0.102	-0.086	-0.013	-0.009	-0.112	-0.042	0.231**	-0.078	0.021
	(0.068)	(0.077)	(0.057)	(0.091)	(0.091)	(0.076)	(0.092)	(0.147)	(0.096)
Elder siblings attained high school or university # parents attained high school or university	-0.328*	-0.360**	-0.128	-0.246	-0.406*	-0.160	-0.373	-0.224	-0.041
	(0.168)	(0.183)	(0.183)	(0.184)	(0.210)	(0.224)	(0.229)	(0.289)	(0.269)
Parents in public sector	0.604***	0.289***	0.100*	0.537***	0.315***	0.075	0.714***	0.210*	0.126
	(0.062)	(0.070)	(0.059)	(0.076)	(0.082)	(0.073)	(0.092)	(0.125)	(0.096)
Parents in private sector	0.280***	0.709***	0.182**	0.204*	0.760***	0.185*	0.409***	0.541***	0.191
	(0.092)	(0.090)	(0.083)	(0.115)	(0.107)	(0.108)	(0.131)	(0.157)	(0.130)
Parents self employed	0.168***	0.152**	0.706***	0.292***	0.261***	0.859***	0.009	-0.045	0.435***
	(0.060)	(0.063)	(0.047)	(0.073)	(0.074)	(0.060)	(0.099)	(0.147)	(0.072)
Parents other status (agricutural sector not working)	-0.077*	-0.102**	-0.003	-0.061	-0.152***	-0.028	-0.090	0.062	0.033
	(0.046)	(0.051)	(0.040)	(0.056)	(0.059)	(0.048)	(0.074)	(0.104)	(0.069)
Parents in attained high school or university	-0.026	0.213*	-0.079	-0.170	-0.059	-0.162	0.052	0.543***	-0.073
	(0.110)	(0.118)	(0.107)	(0.124)	(0.134)	(0.143)	(0.167)	(0.175)	(0.145)
Attained high school or university	1.539***	0.095*	-0.848***	1.247***	-0.237***	-1.149***	2.012***	0.879***	-0.174*
	(0.044)	(0.056)	(0.058)	(0.052)	(0.063)	(0.063)	(0.072)	(0.095)	(0.104)
Constant	-2.471***	-1.210***	-0.782***	-2.526***	-1.119***	-0.695***	-3.293***	-3.042***	-2.479***
	(0.088)	(0.093)	(0.072)	(0.111)	(0.104)	(0.087)	(0.130)	(0.190)	(0.115)
Observations	43,960	43,960	43,960	22,695	22,695	22,695	21,265	21,265	21,265

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
N.B: the following variables are also included in the regression: Birth order; Female (for both gender sex model); Lives in a small town; Lives in rural area; Lives in abroad and age

3.3.7. *Interaction between siblings' network and human capital*

As for the parental professional status, the question here is whether sibship's effect adds up to that of education, especially in finding a job in public and private sectors, or if it is a substitute. We resort on the same model as previously, except that the interaction is between siblings' professional status and individual education level. Estimations clearly indicate that siblings' professional status tends to be, at least partially, a substitute for human capital. As for parental resources, the interaction terms between elder brothers in sector j and individual education level (high secondary school or high education) are all negative, so being endowed with human capital reduces siblings' network effect. Conversely, the efficiency of siblings' network is enhanced in the absence of education. That is, those who didn't perform in school can integrate the public or the private sector because they have elder siblings working in these sectors.

Table 8. Effects of partial interaction between elder siblings' professional status and younger siblings' educational level on younger siblings' professional status (multivariate probit regression coefficients)

	Male and Female			Male			Female		
VARIABLES	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed
Elder siblings in public sector	0.809***	0.326***	0.195***	0.881***	0.352***	0.289***	0.783***	0.408***	0.051
	(0.071)	(0.074)	(0.058)	(0.094)	(0.092)	(0.078)	(0.099)	(0.132)	(0.096)
Elder siblings in public sector# Attained high school or university	-0.525***	-0.214	-0.122	-0.648***	-0.333*	-0.162	-0.424**	-0.161	-0.177
	(0.124)	(0.173)	(0.179)	(0.149)	(0.184)	(0.190)	(0.179)	(0.290)	(0.308)
Elder siblings in private sector	0.201**	1.057***	-0.125*	0.212**	1.230***	-0.105	0.221*	0.577***	-0.082
	(0.080)	(0.076)	(0.066)	(0.104)	(0.094)	(0.084)	(0.117)	(0.153)	(0.100)
Elder siblings in private sector# Attained high school or university	-0.238*	-0.274*	-0.046	-0.350**	-0.543***	-0.147	-0.180	0.145	-0.024
	(0.138)	(0.163)	(0.202)	(0.167)	(0.190)	(0.225)	(0.201)	(0.258)	(0.355)
Elder siblings self employed	0.070	0.121**	0.745***	0.372***	0.282***	0.989***	-0.319***	-0.032	0.393***
	(0.056)	(0.057)	(0.037)	(0.069)	(0.069)	(0.049)	(0.096)	(0.111)	(0.058)
Elder siblings self employed # Attained high school or university	0.041	-0.315**	-0.265*	-0.276**	-0.502***	-0.476***	0.314*	-0.276	-0.208
	(0.106)	(0.156)	(0.135)	(0.128)	(0.173)	(0.150)	(0.162)	(0.261)	(0.236)
Elder other status (agricultural sector not working)	-0.406***	-0.327***	-0.262***	-0.344***	-0.318***	-0.239***	-0.531***	-0.370***	-0.321***
	(0.049)	(0.049)	(0.038)	(0.060)	(0.059)	(0.045)	(0.079)	(0.098)	(0.069)
Elder other status (agricultural sector not working)# Attained high school or university	0.162*	-0.036	0.036	0.210**	-0.006	0.022	0.165	0.040	0.288
	(0.084)	(0.117)	(0.120)	(0.101)	(0.131)	(0.132)	(0.132)	(0.206)	(0.221)
Elder siblings Attained high school or university	0.247***	-0.095	0.015	0.195*	-0.073	0.018	0.338***	-0.111	0.032
	(0.078)	(0.083)	(0.060)	(0.103)	(0.100)	(0.081)	(0.109)	(0.163)	(0.099)
Elder siblings Attained high school or university # Attained high school or university	-0.430***	0.009	-0.130	-0.470***	-0.059	-0.219	-0.455**	-0.009	-0.078
	(0.130)	(0.173)	(0.180)	(0.159)	(0.185)	(0.197)	(0.186)	(0.305)	(0.292)
Attained high school or university	1.749***	0.254***	-0.713***	1.507***	0.011	-0.940***	2.180***	0.930***	-0.149
	(0.055)	(0.071)	(0.071)	(0.065)	(0.077)	(0.079)	(0.092)	(0.131)	(0.133)
Constant	-2.507***	-1.255***	-0.793***	-2.583***	-1.202***	-0.735***	-3.304***	-3.025***	-2.467***
	(0.089)	(0.094)	(0.071)	(0.111)	(0.105)	(0.086)	(0.134)	(0.189)	(0.114)
Observations	43,960	43,960	43,960	22,695	22,695	22,695	21,265	21,265	21,265
Pseudo R-squared	.	.	.	.	.	.	.	.	.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

N.B: the following variables are also included in the regression: Birth order; Female (for both gender sex model); Lives in a small town; Lives in rural area; Lives in abroad

Conclusion

The objective of this paper was to analyze the "modus operandus" of the siblings' network in Niger's labor market. This subject is important since while a survey of the previous studies shows that there is a growing literature on the role of social networks on labor market outcomes, very few address the special case of siblings' network. In developed countries, this issue can be considered less important since demographic transition has already been achieved (each individual has at most only one brother or sister). But in developing countries and especially in Niger, fertility is still high (each individual is surrounded by numerous brothers and sisters). In addition, the Niger's labor market is characterized by a large share of informal and agricultural sectors, where working conditions are bad and earnings low. There are tiny public and private sectors with better working conditions and earnings. But these sectors are far from functioning in a pure and perfect competition way. So one obvious question is whether siblings who succeed in integrating these fruitful and selective sectors manage to ease the integration of their younger siblings.

In this study, we address this question using the Niger 2012 labor force survey. Added to the core survey questionnaire was a module on family network which makes it possible to analyze the influence of family network on labor market outcomes. The methodological advantage in analyzing siblings' network is that no one chooses his brothers and sisters and hence we do not face the self-selection problem commonly pointed out in network studies. But nevertheless brothers' and sisters' positions in the labor market could be determined by a common factor linked to the family of origin. In this study, we control this bias with the parental education level and professional status. To ensure that in spite of this control, our effect is still driven by an overlapping unobserved factor (like family intergenerational ability) which simultaneously determines parental and children positions, we run separate models for siblings from disadvantaged families and for those from well-off families, and these separate models prove that our estimates are robust to the existence of such a factor.

Our main result is that there is a siblings' network spillover effect: having elder siblings in a given sector of activity increases the probability of also integrating that sector. For those in particular whose siblings are in the fruitful public or private sectors, this means that they have additional chances to integrate these coveted sectors. Once the main result ascertained, we also question the heterogeneity of siblings' network effect according to the gender of siblings and according to other labor market competitive factors like family background or own educational level. As gender is considered, we show that siblings' networks are effective both for males and females. But we also uncover that siblings' network is gender-sensitive: its effect is maximal when both siblings and the considered individual are of the same gender. As regards the interaction between siblings' network and other labor market competitive factors, it results from the analysis that the siblings' network acts as a substitute in case of poor human capital or poor family resources. This result is very important since it means that a siblings' network can be considered as a "second chance" factor: those who didn't have the primary chance to be born into a privileged family can

rely on their siblings who, unlike these initial disadvantages, succeeded in integrating the most rewarding sectors of the labor market.

Finally, two main policy recommendations can be drawn from this study. Firstly, given that siblings' network spillover effect is maximal for persons of low socioeconomic status, any policy aiming at increasing the productivity or the remuneration of poor people may generate, through siblings' network, a multiplicative effect. Secondly and in the same vein, gender inequalities are a critical issue in Niger labor market, since few women are active and fewer still are in the most rewarding sectors. Yet women who work in these sectors exert, more than men, a pull effect on their sisters. Hence policies targeting women in the labor market would also benefit from the sisterhood's network multiplicative effect.

Bibliographie

Banerjee, A and Munshi K. (2004). "How Efficiently is Capital Allocated? Evidence from the Knitted Garment Industry in Tirupur." *Review of Economic Studies* 71(1): 19–42.

Bourdieu, P. (1986) "The forms of capital." In J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education* (New York, Greenwood), 241-258.

Cappellari L. and Tatsiramos K. (2015). "With a little help from my friends? Quality of social networks, job finding and job match quality". *European Economic Review*. 78, 55-75

Dhillon, A., Iversen, V. and Torsvik, G. (2013), "Employee Referral, Social Proximity, andWorker Discipline" (University of Warwick, Mimeo).

Donahoe, D. A. (1999). "Measuring women's work in developing countries". *Population and Development Review*, 25(3):543–576.

Eriksen S. and Gerstel N. (2002). "A labor of love or labor itself: care work among adult brothers and sisters". *Journal of Family Issues* n°23: 836-856, doi:10.1177/019251302236597

Fafchamps, M. (2006). "Development and Social Capital." *Journal of Development Studies*, no. 7: 1180-1198.

Gaviria, Alejandro and Dahan (1999). "Momi, Sibling Correlations and Social Mobility in Latin America". *Economic Development and Cultural Change*. Volume 49, No. 3, April 2001: 537-554.

Granovetter, M. (1973). "The Strength of Weak Ties". *American Journal of Sociology, 78*(6), 1360-1380

Hassler, J., and Mora J.V. (2000). "Intelligence, Social Mobility, and Growth." *American Economic Review* 90(4): 888–908.

Heath, R. (2013). "Why do Firms Hire Using Referrals? Evidence from Bangladeshi Garment Factories". Mimeo, University of Washington.

Hsieh, Chang-Tai, and Peter J. Klenow. (2009). "Misallocation and Manufacturing TFP in China and India." *Quarterly Journal of Economics* 124(4): 1403–48.

Kramarz, F. and Thesmar, D. (2013). "Social networks in the boardroom". *Journal of the European Economic Association*, 11: 780–807. doi: 10.1111/jeea.12021

Kuépié, M. Misangumukini, N. (2012). "Environnements économique et éducatif des ménages et difficultés scolaires des enfants au Mali." *L'Actualité économique* 884: 403–428.

Lawson, D., & Mace, R. (2009). "Trade-offs in modern parenting: A longitudinal study of sibling competition for parental care". *Evolution and Human Behavior*, 30(3), 170-183.

Lee K.S. (2014). "Competition for Resources: A Reexamination of Sibship Composition Models of Parental Investment". *Journal of Marriage and Family* 71: 263–277

Mata-Greenwood, A. (2000). Incorporating gender issues in labour statistics. ILO.

Munshi K. (2003). "Networks in the Modern Economy: Mexican Migrants in the U. S. Labor Market". *The Quarterly Journal of Economics*, Vol. 118, No. 2, pp. 549-599

Munshi K. (2014). "Community Networks and the Process of Development". *Journal of Economic Perspectives*. Vol 28, N 4, P49–76

Munshi, K. (2011). "Strength in Numbers: Networks as a Solution to Occupational Traps." Review of Economic Studies 78(3): 1069–1101.

Nicita, A. & Razzaz, S. (2003). "Who benefits and how much? How gender affects welfare impacts of a booming textile industry". *The World Bank: Policy Research Working Paper Series* n°3029.

Nordman C. & Pasquier-Doumer L. (2015) "Transitions in a West African labour market: The role of family networks". *Journal of Behavioral and Experimental Economics*. http://dx.doi.org/10.1016/j.socec.2014.11.008

Nordman C.J., Robilliard A.-S., Roubaud F. (2011), "Decomposing Gender and Ethnic Earnings Gaps in Seven West African Cities". *Labour Economics*, 18, Supplement 1: S132-S145.

Peugny C. (2013). *Le destin au berceau. Inégalités et reproduction sociale*, Seuil 128p.
Sanjeev Goyal (2006) "Social Networks in Labor Markets" in *Connections. An Introduction to the Economics of Networks*, chapter 6, p113-128
Thélot, (1982). *Tel père tel fils ? Position sociale et origine familiale*, Bordas Paris, 1982, 410p.
Voorpostel, M. and Blieszner, R. (2008), "Intergenerational Solidarity and Support Between Adult Siblings". *Journal of Marriage and Family*, 70: 157–167. doi: 10.1111/j.1741-3737.2007.00468.x
Voorpostel, M.B.J. (2007) Sibling support: The exchange of help among brothers and sisters in the Netherlands, phd Dissertation Utrecht University Repository, http://dspace.library.uu.nl/handle/1874/20747
Weichselbaumer D. & Winter-Ebmer R. (2005). "A Meta-Analysis of the International Gender Wage Gap". *Journal of Economic Surveys*, vol. 19, n°3, pp. 479-511.
White, L. (2001). "Sibling Relationships Over the Life Course: A Panel Analysis". *Journal of Marriage and Family*, 63: 555–568. doi: 10.1111/j.1741-3737.2001.00555.x

Appendix

Table 1A. Influence of elder siblings' professional status (dummy and and) on younger siblings' professional status (multivariate probit regression coefficients)

	Both sex			Male			Female		
VARIABLES	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed	Public sector	Private sector	Self employed
Elder siblings in public sector (dummy)	0.352***	0.081	0.166**	0.373***	0.050	0.270***	0.387***	0.245	-0.044
	(0.076)	(0.092)	(0.078)	(0.107)	(0.111)	(0.103)	(0.110)	(0.158)	(0.121)
Elder siblings in public sector (number)	0.224***	0.165***	-0.037	0.239***	0.195***	-0.075	0.179***	0.069	0.035
	(0.042)	(0.052)	(0.047)	(0.060)	(0.064)	(0.064)	(0.063)	(0.088)	(0.066)
Elder siblings in private sector (dummy)	0.367***	0.723***	0.119	0.249	0.744***	0.145	0.485***	0.402**	0.040
	(0.114)	(0.107)	(0.119)	(0.162)	(0.138)	(0.157)	(0.162)	(0.192)	(0.161)
Elder siblings in private sector (number)	-0.146*	0.238***	-0.223***	-0.070	0.319***	-0.274**	-0.220*	0.137	-0.081
	(0.077)	(0.063)	(0.083)	(0.112)	(0.086)	(0.110)	(0.117)	(0.111)	(0.105)
Elder siblings self-employed (dummy)	0.100	0.020	0.392***	0.284***	0.071	0.505***	-0.248**	-0.088	0.056
	(0.072)	(0.092)	(0.058)	(0.094)	(0.115)	(0.073)	(0.113)	(0.150)	(0.093)
Elder siblings self-employed (number)	-0.029	0.059	0.200***	0.009	0.106	0.246***	-0.032	-0.002	0.207***
	(0.043)	(0.052)	(0.032)	(0.056)	(0.068)	(0.043)	(0.063)	(0.078)	(0.052)
Elder siblings other status (agricultural sector not working) –dummy	-0.247***	-0.204***	-0.127**	-0.201**	-0.251***	-0.134*	-0.326***	-0.071	-0.166*
	(0.064)	(0.070)	(0.054)	(0.083)	(0.084)	(0.070)	(0.100)	(0.147)	(0.093)
Elder siblings other status (agricultural sector not working)-number	-0.110***	-0.070**	-0.127***	-0.098***	-0.045	-0.144***	-0.145***	-0.181***	-0.088**
	(0.024)	(0.029)	(0.021)	(0.029)	(0.033)	(0.026)	(0.039)	(0.057)	(0.035)
Constant	-2.599***	-1.414***	-0.966***	-2.682***	-1.218***	-0.987***	-3.433***	-3.722***	-2.461***
	(0.136)	(0.155)	(0.105)	(0.171)	(0.170)	(0.131)	(0.201)	(0.312)	(0.178)
Observations	27,649	27,649	27,649	13,800	13,800	13,800	13,849	13,849	13,849
Pseudo R-squared	.	.	.	.	.	.	.	.	.

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; N.B: the following variables are also included in the regression: Birth order; Female (for both gender sex model); Lives in a small town; Lives in rural area; Lives in abroad and age

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