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Do Communities Tax Education? Evidence from Senegal

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Abstract

Traditional solidarity systems built for cultural purposes but also due to the lack of insurance markets and social safety nets play an important role in development. This paper explores the effect of children's education on the demand for money transfers. In a context where households have to oblige to social rights and obligations, dictated by their community, investment in their children's education might not be optimal. In particular I wish to investigate whether education is a signal of wealth leading to an increase in the demand for money transfers, thereby adding a cost to education. Using the idea that the practice of bride price is an incentive to educate girls more than boys I try to isolate the causal influence of education on transfers by using the sex-specific treatment of children. I elaborate a difference and difference strategy between ethnic groups that practice relatively more bride price than others. This first set of evidence suggests that communities may tend to tax primary education, thereby creating an entry cost to education.

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1 Introduction

African communities have strong solidarity systems that bind people together via a set of social norms, rights and obligations. They exist for cultural purposes but also due to the lack of insurance markets and social safety nets. Kinship relations and local peer groups can exert pressure on households to seek more help. Recent literature shows that people tend to hide their level of income when they live in a solidarity system in order to reduce the demand for transfers. For instance, Baland & al. (2010) show that members of the Cameroonian society take loans to pretend they are poor. This shows, first, that households find it beneficial to underinvest and, second, that people demand money transfers based on observed signals rather than on the direct level of income. Transfer demand is thus based on certain messages associated to wealth.

This article will investigate whether the education of a child is considered to be a signal of wealth, thereby increasing the demand for transfers. In many developing countries educational attainment remains incomplete, despite the legal obligation to educate children. Although the decision to educate may be granted for in developed countries, families in developing countries may still question the benefits of such a policy and influence the allocation of children's time by their discretionary power.

More specifically families invest in education if they consider they can get a return from such an investment in human capital. Such a decision varies with preferences and also beliefs in the future. Educating has an opportunity cost, in addition to potential tuition fees, which makes me think that investing in education can signal that a household has the means to supplement the benefits it would perceive if it had its child spend time helping at home. Overall solidarity systems and the organization of african communities are "institutions" which suggests that there can be tensions between the State's will to educate all and the communities' will to reallocate wealth equally. The idea is thus to understand how communities accept the idea that children get an education. Do they have a tendency to tax it or on the contrary are social constraints released as to ease the access to education?

I try to formalize this intuition with the use of different theoretical mod-

els from the literature to delineate empirical predictions with my data from Senegal. I assume that taxing is heterogeneous and depends on preferences to educate. I thus take gender as a means to underline this signaling and taxing process because educating a boy and a girl is different. Indeed there can be a general preference for boys education in comparison to girls, which could add a signaling power of richness to girl's education but also I consider boy's education responds more to incentives on the labour market, whereas girl's education responds to benefits from the "marriage" market. I shall exploit such a difference to bring a first set of evidence.

In my empirical strategy I shall have a specific look at the impact of education on money transfers sent by households, as they are a good proxy for social constraints. I first test whether girl's education is more likely to be taxed than boys and then instrument my relation to attempt controlling for endogeneity. I use as a source of exogenous variation the interaction between the fraction of children being female and the practice of bride price in the ethnic group of the family. The identification assumption is thus that having more girls in a bride price culture leads to a a higher education and modifies transfers only through that channel. Indeed the difficulty of establishing a causal link is that both transfers and education adjust to the level of income and depend on other unobserved variables that could jointly determine both variables, such as the expected level of risk the household is exposed to. Notably the level of transfers realized can decrease the level of education because people have less monetary power to educate but also education can increase the level of transfers demanded for. Therefore it is necessary to create the circumstances for which the level of education is exogenously increased as to see if transfers vary as a response to a change in a household's level of education.

I find that the OLS regression suggests the demand for transfer is a heterogenous process which may lead to a higher taxation of girl's education compared to boy's. My difference-in-difference instrumentation, nevertheless, does not confirm any causal relationship although it does not discard the hypothesis that education is a signal of wealth.

The remainder of this paper is organized as follows. In section 2, I review the literature that is related to my question and that will be of use further in this

article. In section 3, I present the conceptual framework that will help us better understand the bargaining strategy households adopt to make their decision to educate. Section 4 will present my data and some descriptive statistics. In section 5, I will discuss my empirical strategy and section 6 presents my main econometric results. Section 7 concludes.

2   Related Literature

This question is related to several aspects of the literature in economics.

Starting with Becker (1982), it has been argued in the economics' field that the investment in children is determined by parents' preferences, their income, the number of children they have and the cost of investing in quality. The decision to educate, specifically, is the result of the interaction between all these elements. For instance, Jakoby & Skoufias (1997) demonstrate that, in the absence of complete insurance markets in India, children's attendance to school is closely intertwined with the salaries on the labor market. The less households are likely to get an insurance and the higher wages are, the lower school attainment is, because the opportunity cost to education becomes high. Bjorkman-Nyqvist (2013), finds that in Uganda, income shocks have a significantly negative effect on females enrollment or performance in school. She shows that there is a preference for boys education, likely to have higher returns, and that girls' time is used to smooth consumption in the event of a shock. Rosenzweig & al. also show that, in lean periods, there is a gender bias in the allocation of resources within the household, in India, because future earning opportunities are less for girls than for boys.

This sex-specific treatment of children is conditional on economic conditions but also on social norms. Milazzo & al. (2012), show that, in Ghana, the Intestate Law, passed in 1985 to guarantee that fathers have the right to bequeath land to their children in matriclan groups, decreases the likelihood that boys go to school. Indeed before the law was passed, matriclan families would invest in boys' education as to ensure future incomes to their child and a safe life support for their old days. Ashraf & al. (2015), also prove that customary norms influence school attainment. In Indonesia and Zimbabwe, ethnic groups practicing bride price have a higher probability to send their

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girls to school. This is explained by the fact that families can get a higher price from the marriage of their female child when that child got an education.

Children's education also depends on the spouses' preferences and relative bargaining power within the household. Qian (2008) shows that in China, an increase in wives' income increases boys and girls level of education. Nevertheless Duflo (2012) argues women's empowerment does not always lead to such an outcome. Duflo & al. (2004) use the fact that incomes, in households from Cote d'Ivoire, are allocated to very specific use and cannot be interchanged with another to pinpoint preferences. For instance a rainfall shock on male or female production crops increases the consumption of, this adult's, private goods. It is the increase of the production of yam, traditionally produced on a common plot, independently from gender, which increases significantly the expenses in public goods such as education. Also revenues are not fungible, which underlines the existence of a non-cooperative interaction between members. As Ziparo (2014) theorizes, the various outcomes that result from two spouses' joint decision to finance a public good, such as education can be under-optimal if there is no cooperation. She shows that when income is hidden away and individuals have egoistic preferences (that is they do not feel better for increasing their partner's utility), reducing the level of investment in public goods is the best equilibrium because it leads to not informing the other member of the individual's level of income enabling a reduction in participations in household expenses for ones personal benefit. Eventually this bargaining power doesn't only depend on income but on other conditions such as the conditions outside marriage because they help bargain within marriage. If a wife is without any means of support in the event of divorce she will not be able to pressure her husband during her marriage (Duflo, 2012). Lambert & al. (2016) show that in Senegal, where boys are the only heirs to their father's property, in the presence of a polygamous union, wives tend to reduce birth intervals to ensure that they still have a claim on their husbands property. This suggests they want to maintain their social status and bargaining power within the family.

The decisions made within a household cannot be considered as the maximization of a unitary function, rather is has to be considered as the result of a bargaining process where individuals or cells maximize their utility given the expected attitude of others. This enhances the role played by interactions;

either cooperative or not. The same works for a household's interaction with it's community because in African countries, for instance, households live closely attached to their community. Mahieu (1989), a French sociologist and economist, talks about how african societies organize. He explains that people's decisions are submitted to an additional constraint resulting from social pressure. He shows that individuals are bound to comply with the rights and obligations, set by their peers, before maximizing their utility under their budgetary power. More importantly he mentions that these social norms do not limit themselves to the material world but take into account an imaginary world of fears where sanctions can be infinite and very costly to bear. Thus people are highly incentivized to conform to the social order and not divert from it.

Household's build a strategy vis-a-vis their local community and their extended family in order to maximize their level of income and consumption. As we mentioned earlier, Baland & al. (2011) show that the Bamileke in Cameroon pretend to be poor to escape from local solidarity systems. They take loans to show that they do not have the necessary assets to make money transfers to their relatives. Also Jakiela & Ozier (2012), followed by Boltz & al (2015), who conduct a similar experience, design an experiment in Kenya (Senegal) where they ask individuals, either to save a portion of the incremental income they are offered, or to invest it in a profitable account. They create different groups where people have the obligation to announce the amount they earned and others where they do not and they split every group with one half getting a higher increment. The authors show that when people have to announce publicly how much they have earned, they invest to the lower bound of the increment in order to hide, from their kin, the potential earnings they would have had if they had invested the entirety of their increment. This proves community pressure diverts profitable investments into savings because it increases the cost of such decisions.

In the light of this literature I shall investigate, in the following sections, whether, peer pressure can increase the cost of education potentially reducing the level of optimal education. I shall attach specific attention to gender differences and see how a shift in ones return from girl's education increases or not the level of money transfers sent, which would lead us to consider that education can be considered as a signal of wealth.

3 Theoretical Background

This section reviews two main theoretical models for us to better capture the decision-making process within the household and to make empirical predictions.

Jacoby & Skoufias (1997) argue that when households are confronted to incomplete insurance or credit markets, the decision to educate children is not independent from the level of income. When parents expect an income shock they make a bargaining choice between current and future consumption. This decision depends on the allocation of their children's time they either send to school or use for home production. We first use Bjorkman-Nyqvist's (2013) theoretical model that investigates the same question, conditional on gender, to better understand the incentives faced by a household to educate a girl or a boy. Although girls and boys have the same abilities, a_s^i it is less likely that girls work on the labour market, earn an income and send a portion to their parents in need. Also sending children to school has an opportunity cost because they have the ability to generate value from home production. We thus have the following household constraints leading to a proposition resulting from the resolution of the equilibrium:

3.1 General Framework

Consider a household i, living a two period lifetime ($t = [1, 2]$), with a boy (b) and a girl (g). The first period parents choose to educate their children or not, the second period, parents receive money transfers from their adult children. Household's maximize the following:

$$V = \begin{cases} Max \quad U_i = u(c_1^i) + \delta c_2^i \\ \\ s.t. \quad c_1^i = y_1 - pe_b^i - pe_g^i + \eta_b(1 - s_b^i) + \eta_g(1 - s_g^i) \\ \& \quad c_2^i = y_2 + \gamma_b y_b^{ai} + \gamma_g y_g^{ai} \end{cases}$$

where c_t^i is parent's consumption in period t, δ a discount factor and u is the household's utility function with $u' > 0$, and $u'' < 0$. Consumption depends

on: y_t, parent's income in period t, p the price of schooling, e_s^i a dummy representing whether a child goes to school (with subscript $s = (b,g)$) and $\eta_s(1 - s_s^i)$, the value of home production in period 1. y_s^{ai} is the income generated by the adult child in period 2 and γ_s is the share of this income sent to parents.

Skills are acquired with time spent in school, $s_s^i \in [0,1]$, and learning abilities α_s^i (which depends on natural abilities, children or parent's motivation, etc.): $a_s^i = \alpha_s^i s_s^i$. It is assumed that girls and boys have the same learning efficiency: $\alpha_b^i = \alpha_g^i = \alpha^i$. The income, adult children earn, depends on the returns to education ω_s and skills, a_s^i: $y_s^{ai} = \omega_s a_s^i$.

We make further assumptions: Bonsang & al (2005) show that, in Senegal, the probability for a girl to housework is 50% and does not seem to depend on the household's level of income whereas boy's probability to housework is much lower and approximates 10%. We can thus fairly assume that households value more girl's household production than they do boys: $\eta_g > \eta_b \equiv 1$. Also we can reasonably assume that $\gamma_b > \gamma_g$, implying boys send more contributions to their parents than girls do because they work more on the labour market and remain close to their family, whereas girls are destined to marry and move out to get closer to their husband's family. Eventually $\omega_b > \omega_g$, returns from the labour market are higher for boys, or at least households expect to find this happening. Under these hypothesis Bjorkman-Nyqvist shows this model generates the following proposition:

> "Proposition 1: a) It is always optimal for parents to invest in more (or at the minimum as much) education of the boy as compared to the girl, $s_b > s_g$; b) A girl will attend school iff the boy is sent to school full-time; c) a reduction in the boy's education is only optimal iff the girl works full-time in domestic work; d) If both $s_b > 0$ and $s_g > 0$, a reduction in parental income, y_1, will on the margin reduce investment in the girl's education; e) a reduction in parental income, y_1, primarily affects girl's cognitive skills, a_g" (BJORKMAN-NYQVIST, 2013)

3.2 Asymmetric Information and Signaling Game

Inspired by Ziparo (2014) and personal knowledge, I now assume that every household i has the social obligation to answer the demands for money transfers or else it well get severely sanctioned by the "community". Such a demand depends increasingly on the relative level of the household's income. The wider the difference between the demander (2) and the sender's (1) income, $\frac{Y_1}{Y_2} > 0$, the more the person is entitled to demand money and to receive it. Nevertheless in an environment of asymmetric information, where the level of income is unobserved by peers, the household can deliberately scramble the signals of its relative level of income to benefit from a higher level of household consumption. If the signal is related to education then the trade-off between today's consumption and tomorrow's is made more acute. Specifically consuming more tomorrow becomes more expensive, in todays terms, because the cost to education increases. In other words consuming more today becomes more attractive because the opportunity cost to education increases.

Notably the opportunity cost is higher for girls than for boys. Therefore the more children get an education and in particular the more girls get an education the higher people are likely to consider this household has the ability to overcome the standard costs for educating children, thereby revealing a purchasing power. The household can send a set of messages depending on the number of children they have, their age, their rank and their sex. Intuitively, if a household has first a boy and then two girls, all belonging to the same age group then we could have the following ordering of a signaling power for the education of these children: (B,G,G)>(G,G)>(B,G)>(G)>(B). The first case represents all children going to school and the last only the boy. Sending all girls to school, rather than a boy and a girl is likely to send a higher signaling power because girls' opportunity cost is higher than that of boys. This is even more true if the boy is the first born and if all children belong to the same age group. Overall we can imagine the family will have to make more transfers for educating all his children and even more if they are all girls. Nevertheless it is good to take notice that I set the intuition of there being an ordering more than I make a formal proof. Depending on the utility function and the parameters we could have other orderings such as (G,G)>(B,G,G) because the boy does not get an education even though

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he is the first born. The idea here is mainly that these signals vary with the composition of the household and that the signal is clear to the sender and the receiver.

Under these circumstances and independently from any other gender preferences if my assumption that education is a signal of richness holds and if keeping a girl in school is commonly known to be less profitable than keeping a boy in school then I should find that when this signal is observed the demand for transfers is higher for girls than for boys. If households are aware of such a process we can build the following signaling game: first the household receives a relative level of income, $\frac{Y_1}{Y_2} > 0$, second it chooses the level of education that will signal it's level of richness, then the "community" will observe this signal and choose it's demand for transfers that the household will oblige to, and eventually everyone receives its payoff.

If we assume there is a random composition of boys and girls for every household, then the higher the ratio of education, $\bar{e}$, for a given age group the higher it is likely that girls get an education. Therefore with $\frac{\partial t}{\partial \bar{e}} > 0$ and t representing the demand for transfers, we get:

- A Separating Equilibrium: $\frac{\partial t}{\partial \bar{e}} \frac{\partial \bar{e}}{\partial \frac{Y_1}{Y_2}} > 0$

- A Pooling Equilibrium: $\frac{\partial t}{\partial \bar{e}} \frac{\partial \bar{e}}{\partial \frac{Y_1}{Y_2}} < 0$

Indeed the first equation implies that the higher the relative level of income is, the higher people invest in schooling. On the contrary the other implies that that same household will choose the inverse strategy and marginally reduce its level of investment in education to lower community pressure as income increases.

If we consider the levels of sanctions are high enough to have the level of demand always equate the effective level of transfers sent, I can predict, from this framework, that educating more children results in an increase in the level of transfers effectively sent by a household. If we find that transfers are not significantly influenced by the level of education then either education is not a signal or we have a pooling strategy. That is education

is sufficiently uninformative for people not to guess the household's level of income. In other words households underinvest in education as to reduce the level of transfers sent. Eventually if the level of transfers are significantly negative in response to education, then we cannot consider education as a signal of wealth, rather we can consider the community values it. In my empirical strategy I shall not seek to evaluate the impact of the relative level of income on education because such an information is not available. Instead I shall evaluate the link between education and transfers and use the absolute level of income as a control. Fundamentally I can only evaluate a separating strategy (education leads to a positive and significative variation of transfers) or that education is not a signal when transfers are significantly negative. Else, if transfers are positive and non significant I cannot tell whether households make a pooling strategy or do not consider education as being a signal. Nevertheless the pooling strategy is an extreme case where education is uninformative. It is possible households choose an in-between where their choice of education lowers social pressure. I shall discuss the empirical specificities in the following sections.

4 Data

4.1 The survey "Poverty and Family Structure"

The data used here comes from a survey "Poverty and Family Structure" (PSF) conducted in Senegal, first in 2006, and second in 2010. The first wave is nationally representative and interviews 1800 households located in 150 randomly drawn census districts. The second wave is a follow-up of the members of the first survey. PSF2 comprehends the original household members (with potentially new ones) as well as the composition of new households created after the departure of one member from the original household. This wave thus has 3020 households, increasing the information I can have on household strategies.

The survey gives details on individual characteristics but also on the household structure with additional subdivisions where members enjoy a relative financial autonomy within the household. Information on the type of family relation to each head of the subdivisions are registered. Also with Senegal

being a polygamous society, households are identified as being "primary" or "secondary" because a marital union binds these households. Data on marriage including information on dowry or bride price, is also available and I have detailed information on individuals' education, occupation, income and expenses and the amount of money transfers sent and received by the household, to whom and why.

Education attainment of each member in the household is recorded at the moment of the survey and doesn't take into account fluctuations throughout the year. Frequency levels are registered for each type of expenses for diary and other products as well as for each type of transfer sent or received. They summarize the budgetary power of each household for a year span. This means that I do not have records of fluctuations of these annual levels of expenses[1]. I also have information on the household's annual labour income although some households do not earn any as they rely on barter trade and auto-consumption, which implies I do not have a proper record of their income generation capacity.

Figure A and B in Annex 1 report the average differences between income and expenses. The income quintile distribution (figure A) of expenses and income shows that poorest have a much higher level of expenses which can suggest measurement errors of the household's income generating capacity. The richest's difference between income and expenses is consistent with the idea that marginal propensity to consume decreases. Figure B takes quintile expenses and shows that on average expenses are similar to the level of income. I nevertheless decide to keep labour income as my measure of "richness" as I do not want to overstate a household's income generating capacity by taking into account various external contributions to expenses[2].

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[1] I do not seize changes within seasons such as planting and harvesting seasons but I do have information on certain types of shocks experienced by the household which could be of use for further investigation

[2] I wish to seize the household's strategy between income and transfers but this is a debatable question as expenses can also give an idea of the image of richness the household sends to others.

4.2 Descriptive statistics

Senegal is a West African country located between Guinea, Mauritania and Mali and is the product of various influences such as Islam, traditional ethnical customs and its past colonial history. The country inherited political institutions from the French, such as the Napoleon Code, certain laws passed before independence, in 1960, or its political structure. Nevertheless France's influence remained rather limited in terms of culture to the extent that the country was split into four colonial towns, the *"Four Communes"*, and the *"Indigineous"* rest, submitted to the French indigenous code, more respectful of local traditions. The Senegalese remain in vast majority muslim, with 95% of people belonging to different sunnit brotherhoods and claim to be a member of an ethnic group, such as the Wolof (45%), Poular (24%) and Serere (14%).

Today agriculture is the main source of occupation (see table 1), even though it represents 15% of the country's GDP growth in 2015. In my sample 61% have an activity linked to farming or livestock. Also most people live in rural areas (52% in my sample) or small cities or towns (20% of my sample) but urbanization has increased since independence. Polygamous marriages where men have several wives are frequent. In my sample 40% of women and 25% of men share this type of union. Women on average give birth to 4,5 children and the medium age for girls to get married is 24,5 years and 30 for boys. Table 1 summarizes these statistics and gives other household characteristics. I consider separately ethnic groups in favour of the practice of bride price and those against, in comparison to the wolof ethnic group, because these statistics are interesting for my empirical strategy. I also consider the entire sample ("All") in this table.

4.2.1 Education in Senegal

The government's strategy of years 2003-2010, (*"Strategie de Reduction de la Pauvrete" - DSRP*), made it a priority to increase attainment to primary school by providing more schools and by improving the quality of the institutions with more teachers. For instance, in 2007, the government delivered 750 additional school classrooms. Overall in 2013 the country had approximately 9000 primary schools and 1660 middle schools more or less evenly

Table 1: Descriptive Statistics

| | **Bride Price Ethnic Group** | | |
	FOR	**AGAINST**	**ALL**
INDIVIDUAL CHARACTERISTICS			
Age	22.9	23.5	23.9
Urban Zone	44.3	42.2	47.1
No Education	49.4	39.6	49.5
Muslim	97.2	87.9	96.7
Agriculture	59.7	67.7	61.2
Informal	6.6	7.3	6.3
Age Mariage (women)	23,6	26,13	24,5
Polygamous Union (males)	21.8	19.4	25.4
Children/Women	4.48	4.44	4.51
Bride Price	82.2	69.8	78.1
HOUSEHOLD CHARACTERISTICS			
Education Level HHH (%)			
No Education	65.6	54.8	61.4
Primary Education	16.3	24.2	19.04
Coranic Education	0.2	0.2	0.14
Secondary Education 1-4	7.9	7.1	8.3
Secondary Education 5-7	5.4	7.3	5.93
Tertiary Education	4.7	6.4	5.12
Sex HHH(%)			
Female	21.5	28.2	25.89
Male	78.5	71.8	74.11
Fostering Children			
Average	1.08	1.01	1.15
Labour Income (CFA)			
Average	1,574	1,708	2,325
1st quintile	202	171	190
5th quintile	6,972	7,681	9,041
HH Expenses(CFA)			
Average	2,958	2,442	3,247
1st quintile	810	774	813
5th quintile	10,700	11,200	11,400
Transfers Sent (CFA)			
Average	195	220	233
1st inc. quintile	81.2	69.9	87.5
5th inc. quintile	510	642	583
Transfers Received (CFA)			
Average	788	560	706
1st inc. quintile	747	405	642
5th inc. quintile	973	1,145	1,052

spread throughout the different regions, according to population size. The system is organized according to the French system with three different levels: primary education, subdivided in three academic cycles of two years each; "college", the first half of secondary education which lasts four years and "lycee", the second half of secondary education which lasts three years. Acceptance to the three academic levels requires a certificate, attesting all years have been completed, and requires to pass a test. There is a test to enter "college", with an age limit of 14 years old and another to enter "lycee".

Table 2: Education Level

	Age group									
Education Level	10 and less		11 to 14		15 to 18		More than 18		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
No Education	2,640	51.6	617	24.4	683	28.8	7,381	54.5	11,321	48.1
Primary	2,405	47.0	1,282	50.6	224	9.5	36	0.3	3,947	16.8
Secondary 1-4	6	0.1	458	18.1	785	33.1	285	2.1	1,534	6.5
Secondary 5-7	1	0.0	4	0.2	157	6.6	436	3.2	598	2.5
Tertiary	0	0.0	0	0.0	6	0.3	242	1.8	248	1.1
Stopped at Prim	63	1.2	152	6.0	433	18.3	3,204	23.7	3,852	16.3
Stopped at Sec 1-4	2	0.0	20	0.8	78	3.3	1,076	7.9	1,176	5.0
Stopped at Sec 5-7	1	0.0	0	0.0	3	0.1	458	3.4	462	2.0
Stopped at Ter	0	0.0	0	0.0	0	0.0	422	3.1	422	1.8
Total	5,118	100.0	2,533	100.0	2,369	100.0	13,540	100.0	23,560	100.0

The law stipulates that school attendance is mandatory from 6 till 16 years old in any private or state school, but my data shows that approximately 35% of all children under 16 have never attended school, and many others attend school when older than the "regular age" (see table 2). For instance 50,6% of children aged between 11 and 14 still go to primary school. State schools are free according to law but it is common that children need to pay an entrance fee, going from 1500-3000 FCFA (2,75-4,5 €) on average, for maintenance costs. Private schools are more expensive as they can go from 3500 FCFA (5,3 €) per month to 25000 (38 €).On average in Dakar it costs 10000 FCFA per month (15 €) to go to private school (Niang, 2014).

The data in Annex 2 also suggest that men may be in majority in charge of

the decision to educate children because when money transfers are received for education purposes, men, in majority, receive them whereas women received in majority all the other transfers (table A), as social norms dictates it (Moya, 2014). Also it seems that household heads make the final decision to educate (table B). Although this decision is the result of a bargaining process that is difficult to unveil, among all children in school at the moment of the survey, 80,7% get their education financed by a household member and in 68,5% of the cases the households' head take over the education expenses. When it is not the case, one of his close relatives does (wife, child, brother, etc.) (table C)

Qian (2008), argues that the gender of the member to make the decision to educate is decisive to the attainment outcome. She shows that in China, when males have more bargaining power they tend to reduce girls' education whereas they do not change boys. Women on the contrary increase both boys and girls education when they have more power to decide. If there is such a discrimination observed in Senegal this could potentially add a signaling power of "richness" to girls' education. If I have a look at the propensity to educate children, indistinctly from the level of education considered but depending on the gender of the household head (see table 3), I can see that male heads do not seem to discriminate girls. Nevertheless a household with a woman as head has a higher propensity to send children to school in general, even though this propensity is higher for girls.

Table 3: Censor Ordered Probit on the Young (inf. 18yrs)

	(1) Education Level
Male Child	0.016
Female Household Head	0.283***
Male Child * Female HH	-0.169**
Constant	6.718***
Observations	8245
Pseudo R^2	0.229

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.2.2 Money transfers and social obligations in Senegal

Mahieu (1989) argues that african societies belong to a specific social order, a community order, among which social obligations have a strong influence on economic decisions and outcomes. To better delineate the parameters of community pressure, he listed the different means through which social obligations can be satisfied. The list includes the following: money transfers, labour work, time, such a visiting regularly a sick member of the community, benefits in kind, such as meals, and the fostering of a child. Each of these transfers can be a substitute to the other and their demand closely depends on the social position held by the member in the community. These obligations are attached in part to local villages but not only. Geographic proximity is not the only determinant as ethnic groups (or pluri-ethnic groups in a more modern world of interactions [3]) also play a part in determining which should be an individual's obligations. In addition to these horizontal ties there are also vertical ones created via the birth rank of the individual in his family. All these ties sum up to creating a "community" for each individual that set up rights and obligations. For instance, urban settlers who often send money to their peers in rural localities gain the right to send their children to their village. Obligations can also be asked depending on the relative position within the family (first born as opposed to last born) and sometimes independently of the level of income but in most cases they are attached to a will of redistributing assets within the community.
In Senegal a young states:

> "I got [a] job [at] the SONATEL (Senegalese Telecommunications Company) (...) It's been a year now. I'm trying to save money with Ahmed, my younger brother (...) but in fact I do not have any more money than before, when I was unemployed. Now almost every day someone comes here and talks to me about one problem or another . And almost every time, I have to give money to somebody" (MOYA I., 2015)

If an individual fulfills an obligation he is also entitled to a reciprocal right. The definition of this right is not strict as there does not exist an equiva-

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[3]Pluri-ethnic groups result from relationships through work, religion, but also from a social and political construct such as argued by Etienne Smith (2006) who shows that in Senegal, specifically, "cousinage" relationships forge bonds between different ethnic groups.

lence grid such as for commodities with money. Rather the "community" remembers a person fulfilled an obligation which entitles him for help in the future, provided help can be given. In such respects this system is similar to an insurance policy even though it is by no means as certain because the odds of help are biased and often unknown by the participant.

Ceremonies are crucial to the sustainability of such a solidarity system. Moya (2004), a French anthropologist, describes the baptism ceremony of a Wolof child in poor suburbs of Dakar. He follows the different family and community interactions resulting from this religious process and observes the strong role played by money. He demonstrates that these ceremonies, through the money they generate, drive a future set of social obligations and generally oversee that the structure of social obligations is extended to the future generation. As figure 1, below, illustrates every quintile of the income distribution makes regular transfers for ceremonial purposes. These transfers generate rights and are at the basis of the structure. Then depending on income people make transfers for other purposes such as financial help, savings, education, etc. (see Annex 1). As I can see on the graph the upper quintile sends more transfers for other purposes than ceremonial ones.

Figure 1: Type of Transfers by Income Quintile
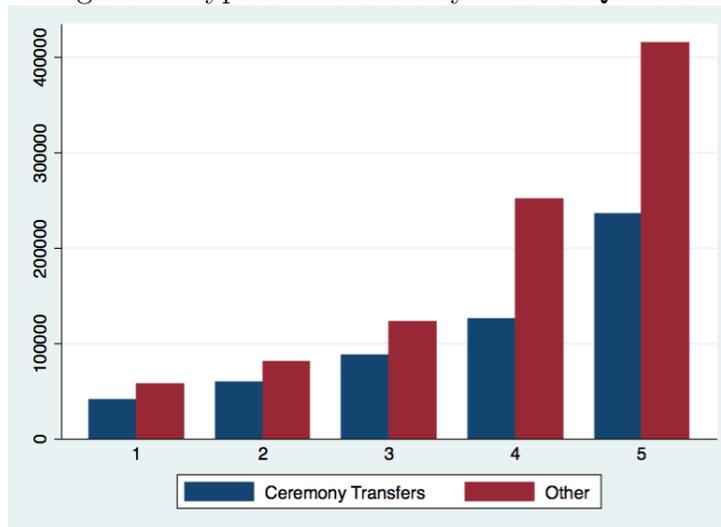
Figures 2 and 3 give an overview of the structure of effective transfers realized by households throughout their income distribution. Transfers received from Senegal or abroad are equivalent for every quintile on average (figure 2), showing that this solidarity system aims to redistribute equally the amount of transfers made. Only the last quintile receives additional transfers from abroad. This could be explained by the fact that this last quintile sends migrants to more developed countries where money has a higher purchasing power in local currency. On the contrary, transfers sent in the country, depend on the level of income earned: richer make higher levels of transfers, although transfers abroad are practically null. This is probably due to the fact that households finance the trip of the migrants they send and thus do not need to send more money once he/she is settled abroad. Figure 3 shows that net transfers received are positive for all thanks to contributions from abroad but the portion of net transfers received from Senegal slowly diminish up to becoming negative for the last quintile, who sends more than receives. If demand for transfers strictly equate the transfers effectively sent I can see that social pressure increases with the household's level of income. I shall use this structure based on wealth to assess whether communities and families tax education and shall add controls to take into account other hierarchical structures.

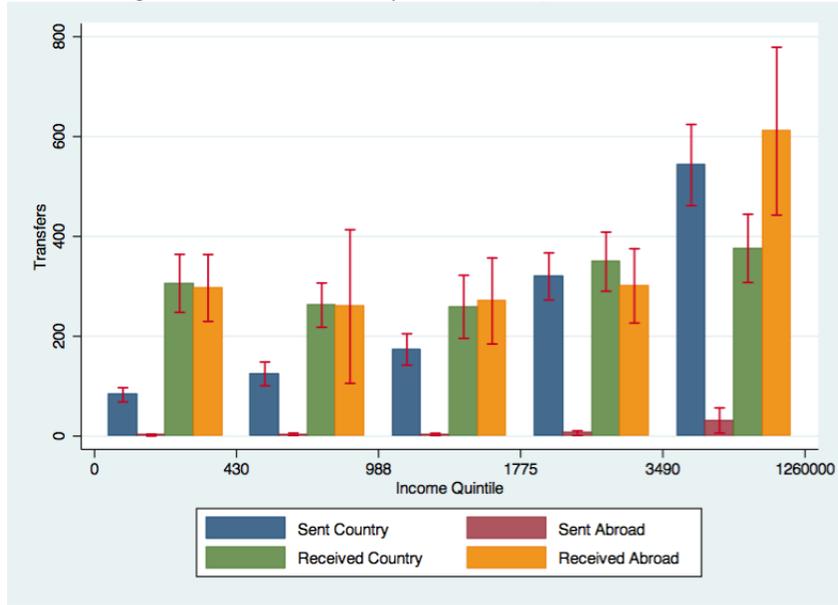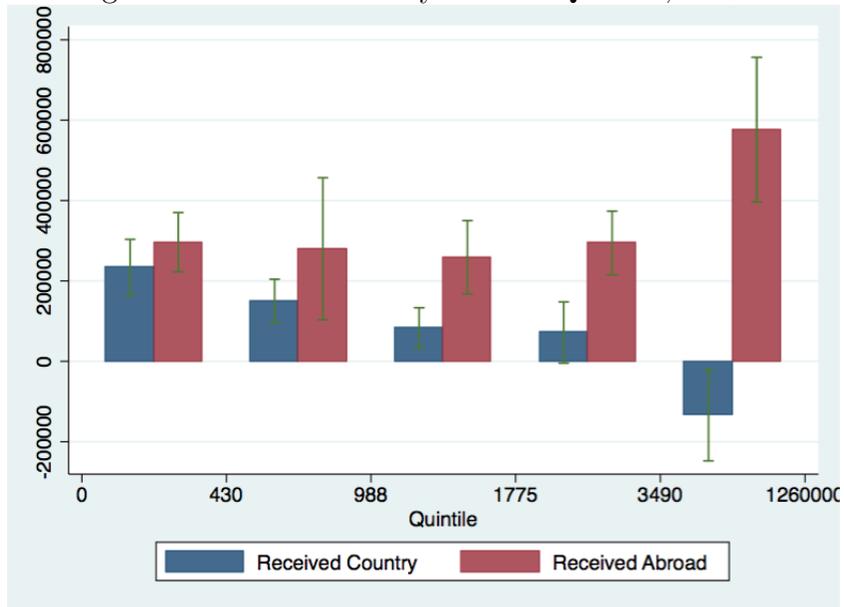Figure 2: Transfers by Income Quintile, 95%CI

Figure 3: Net Transfers by Income Quintile, 95%CI

5 Empirical Strategy

To test whether communities tax education or not I shall study the impact of educating children on money transfers. I use the total amount of money transfers and benefits in kind, registered in monetary sums, sent by the household, throughout the past year of the survey. I thus consider transfers that are made on a regular basis by using the regular amount sent with their frequency level, as well as those sent exceptionally. This includes transfers that have various purposes and recipients. I do not consider specifically one sub-group to whom transfers are sent to, to take into account the general level of taxation in the extended family and in the local peer community. The baseline regression is the following with j being the household.

$$Transfers_j = \alpha + \beta School_j + \sum X_j + \epsilon_j \tag{1}$$

$School_j$ represents the household's current attendance rate for every chosen level of education, $\sum X_j$ represents a set of control variables including household characteristics such as religion, ethnic group, average age, income, parents education, etc. and other controls that could influence the level of demand for money transfers such as the number of brothers and sisters of all the parents in the household, the fostering of a child, if the household head is a first born child, etc. Eventually ϵ_j represents an error term.

5.1 Cohorts

Consistent with my model I assume that sending children to school at a regular age can signal that a family has the intention to invest in human capital and that it has the means to do so. For instance sending a child to primary school below his 10 years old is more likely to signal this intention than someone sending his child to primary school after 10. I also assume that having a secondary education is likely to signal the household to be "wealthy" to its community than having an elementary education. Indeed going to primary school has become a rather standardized practice, whereas I can consider secondary education remains an odd practice even more dependent on household's discretionary power. I will eventually have a look at the transfers realized by the household head himself, as it is possible that

people direct their transfer demand to household heads rather than to other members of the family.

More specifically I take a look at four cohorts: the children in primary school from 3 to 10 years old and from 3 to 14 years old and eventually the children that are in age to go to the first half of secondary school ("college"), excluding the eldest ("lycee"), aged from 10 to 14 and from 10 to 18 years old. I take into account children in secondary education as there are enough schools to attend to all over the country and also because most people who attempt the entry exam achieve it (70,4% in 2008 according to the ANSD[4]) There is an entry exam to the second half of the secondary school ("lycee") which is more difficult (37,3% of all children who attempted it, achieved it, in 2008).This could add quality variables to the education system which is not what I am looking at. Also I cannot assume that people in "lycee" are comparable to the others as they did not benefit from the government's DSRP policy as much as the other students did.

5.2 Identification strategy and assumptions

In order to isolate the impact of educating children on transfers, my empirical strategy is to build a difference and difference estimation. Specifically I want to create an exogenous variation in children's level of education and observe whether demand for money transfers increase. I want to compare two subgroups that decide to educate more or less one gender because a rule or a custom creates an incentive to make this decision. The difficulty of this exercise is that I do not want an instrument that creates an obligation to educate children because the signal exists only to the extent that education is and remains a choice of the household. I thus want a custom that creates higher or lower returns to the education of a girl or a boy.

$$DiD = (E[t|Rule = 1, Girl = 1] - E[t|Rule = 0, Girl = 1]) -$$
$$(E[t|Rule = 1, Girl = 0] - E[t|Rule = 0, Girl = 0])$$

Such a strategy implies that I make the **first assumption** that sex ratios are perfectly balanced. In other words I consider that children's birth is exoge-

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[4]Agence Nationale de Statistique et de la Demographie

nous to all characteristics and that there is no initial gender selection. This is important because an altered sex ratio could change the odds of sending a girl to school in comparison to boys, which would exclude the possibility to compare the two genders. Indeed if the decision to educate depends on the number of children that have already had an education, having more boys can reduce the probability that all boys get an education versus all girls, even though boy's education is favoured to girls. My estimation would systematically be biased and gender ratios would not be random. Figure 4 shows such an assumption is respected.

Figure 4: Ratio of Boys by Age Interval
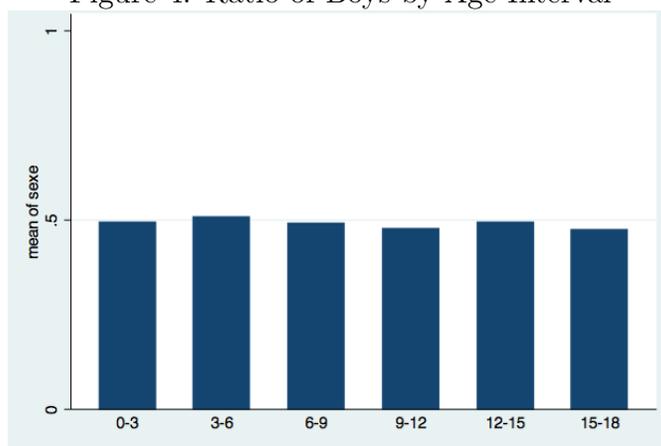
I make the **second assumption** that this incentive does not distort the power of the signal, meaning I consider families who demand transfers based on the expected returns from education, do not adjust their demand because they know families who educate have a higher level of return from education. Namely I assume that people who observe education do not know precisely what the returns are for the family who educates.

I use Ashraf & al's (2015) recent proof to build my empirical strategy. Bride price consists in a *"transfer of a substantial consideration in the form of goods, livestock, or money from the groom or his relatives to the kinsmen of the bride."*(Murdock, 1981) They show that in Indonesia and Zambia, families belonging to ethnic groups that practice bride price send more their

girls to school, following the construction of primary schools. Non-practicing groups nevertheless sent more their girls to school before hand. This proof is interesting to us as I can isolate two groups that have two different payoffs from a girl's education. The groups practicing bride price educate their girl-child to obtain a better price from marriage. They are not as interested in investing in human capital than none practicing groups. In my sample of married women aged more than 20 years old, those having received a bride price compensation had a higher propensity to not complete primary school or go to secondary school than the ones who did not receive a bride price (see table 4). I shall build on this proof to pursue my empirical strategy but do not undertake further empirical verification of this relationship, that I take for granted with the authors' demonstration. I consider this custom to be the rule that will enable me to identify the impact of education on transfers.

Table 4: Ordered Probit on Married Women

	(1) Achieved Education
Bride Price (No)	0.162***
Urban Zone	0.729***
Birth Rank	-0.004
Brother First Born	-0.062
Age	-0.023***
Religion Controls	✓
Ethnic gpr Controls	✓
Job Controls	✓
Observations	3290
R^2	
Pseudo R^2	0.157

My data provides information on the amount of transfers made at marriage. It specifically asks to married husbands whether they payed a bride price: *"Have you given a financial contribution to the family of your wife/wives?"* Raw descriptive statistics of my data (see table 5) suggests that there are no specific ethnic groups practicing it. Indeed in Senegal there is no clear

Table 5: Practice of Bride Price

| Ethnie | Bride Price | | | |
| | Yes | | No | |
	No.	Row %	No.	Row %
Wolof	1,867	78.0%	527	22.0%
Serere	467	71.6%	185	28.4%
Poular	1,029	83.0%	211	17.0%
Diola	120	64.9%	65	35.1%
Mandingue/Soce/Bambara	232	80.0%	58	20.0%
Sarakhole/Soninke	59	83.1%	12	16.9%
Mandiaque	34	87.2%	5	12.8%
Other senegalese ethny	112	77.8%	32	22.2%
Other african ethny	12	63.2%	7	36.8%
Other non african ethny	1	33.3%	2	66.7%

division in this practice and it appears that ethnic groups generally perform bride price when young girls get married. The *world ethnographic sample* (Murdock, 1957) which provides information on the prevailing mode of obtaining a wife, shows that all ethnic groups in Senegal indistinctly make this marriage transfer. Nevertheless people still make the arbitrary choice to practice it and there are groups practicing it and others not. Using the interaction between the practice of bride price and the ratio of young girls as my instrument I would have the following:

First step:

$$School_j = \alpha_0 + \alpha_1 I^{BridePrice} \times femaleratio_j+$$

$$\alpha_2 I^{BridePrice} + \alpha_3 femaleratio_j + \sum X_j + \nu_j \qquad (2)$$

Second step:

$$Transfers_j = \beta_0 + \beta_1 School_j + \beta_2 I^{BridePrice}+$$

$$\beta_3 femaleratio_j + \sum X_j + \epsilon_j \qquad (3)$$

I assume that the education of boys although potentially different in-between bride price practicing groups is not different from the education of girls in-between these groups to the exception that girls who will get a bride price get a higher level of education than boys do. The parallel trend assumption is verified if, in the absence of bride price, boys and girls have the same education attainment difference for all ethnic groups. Overall boys represent my control group and I wish to see if a different level of education for girls from a group to the other is likely to increase the level of transfers realized. Figure 5 summarizes the idea.

Figure 5: Difference in Difference estimation
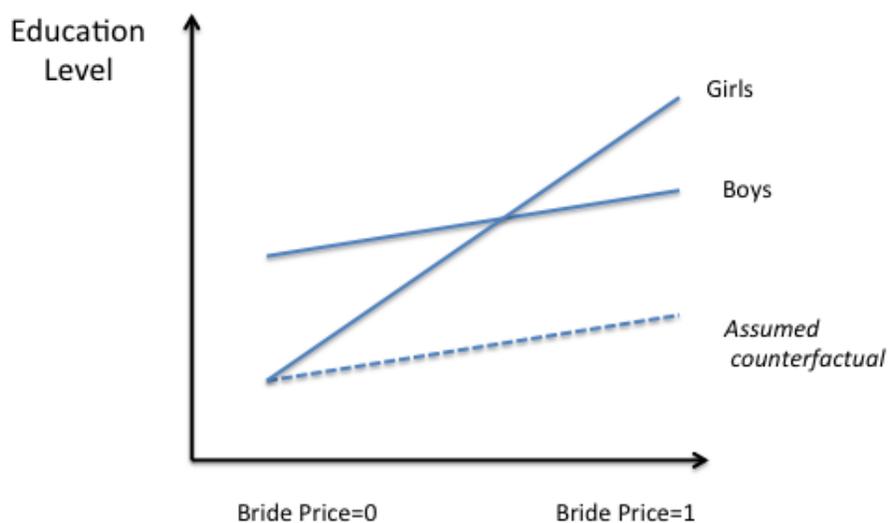
Since the households select whether or not to practice bride price I do not use that variation but simply the one that stems from ethnic preferences for bride price. Indeed if I take bride price as an instrument and not ethnicity I cannot intuitively reject the exclusion condition and have to assume $Cov(Z, \epsilon_j) \neq 0$ for two reasons. The first is that this practice is not exogenous to household decisions which could influence the amount of transfers sent; the second is that I am not certain that the practice of bride price does

not distort the structure of transfers sent from a household due to the fact that this marital practice represents a transfer in itself and initiates a future set of transfers. As a matter of fact ethnicity is still highly correlated with the practice of bride price. Although all groups seem to perform it, there are variations from the average, determined by the Wolof majority group, representing 46% of my sample. Table 6 shows that there are very significant positive and negative variations by ethnic groups as opposed to religion, where there does not seem to be any notable variations. Serere for instance have a lower chance of practicing bride price by 7,3%, Poular have a higher chance of 6,3%. Therefore I have decided to use the interaction of ethnic groups with the ratio of young girls to instrument my regression having on the one hand groups that practice relatively more bride price and those that do not compared to the Wolof ethnic group. I thus have: Serere, Diola and other none-Senegalese ethnicities that do not practice bride price as much as the average and Poular, Mandingue, Sarakhole, Mandiaque and other Senegalese ethnies that practice it more than the average set by the Wolof. Both groups represent 20% and 34% of the households of my sample, respectively. Also because various households have members belonging to different ethnic groups I have decided to include households where more than 70% belong to one or the other groups previously delineated. Table 1 presents elementary statistics of the two groups.

Table 6: Determinants of Bride Price

Variable	Coefficient	(Std. Err.)
Serere	-0.073***	(0.019)
Poular	0.063***	(0.015)
Diola	-0.119***	(0.033)
Mandingue/Soce/Bambara	0.064**	(0.028)
Sarakhole/Soninke	0.054	(0.051)
Mandiaque	0.110	(0.069)
Other senegalese ethny	0.010	(0.036)
Other african ethny	-0.164*	(0.098)
Other non african ethny	-0.413	(0.259)
Muslim: Mouride	0.041***	(0.014)
Muslim: Khadre	-0.090***	(0.027)
Muslim: Layene	-0.042	(0.067)

Continued on next page...

Variable	Coefficient	(Std. Err.)
Muslim: Autre	0.030	(0.036)
Christian	0.006	(0.043)
Christian	0.000	(0.000)
Other religion	-0.059	(0.318)
Intercept	0.766***	(0.011)
N	4967	
R^2	0.018	
$F_{(15,4951)}$	5.987	

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

Using (ethnicity*female ratio) as my instrument leads me to making one additional assumption. The **third assumption** posits that these two groups of ethnicities effectively influence transfers via their education selection and not through another channel. In addition to controlling for the influence of these groups on transfers, I try to avoid as much omitting variables and control for as many household and cultural specificities. Overall I assume that both groups are comparable in the transfers they send and that nothing apart from their decision to educate girls, parts them. After conducting t-tests and checking that the structure of the transfers is similar, I assume this condition is likely to be verified. Indeed table 7 shows that transfers are significantly even on average whether they are sent from an urban or rural household and looking at raw data it seems these later respect the same structure in terms of object, recipient, nature, type, location which implies that these two set of groups belong to the same solidarity system and are confronted to the same constraints and household strategy.

5.3   Discussion

If the assumption made above holds my empirical strategy should enable me to tackle reverse correlation between transfers and education and establish a causal link between children's education and monetary transfers. My strategy

Table 7: Household Transfers by Ethnic Groups

| Urban Zone | Bride Price Group | | p-value |
| | FOR | AGAINST | |
	Mean	Mean	T-test
No	120,391	153,876	0.103
Yes	294,982	296,170	0.665
Total	205,567	220,403	

is interesting as it keeps to Senegalese's social landscape, highly determined by the Wolof majority group and smaller peripheral ethnic groups that interact frequently through "cousinage" relationships (Smith, 2006). Each ethnic group has its own specificities but does not live in isolation. On the contrary close links tie them together which enables me to consider certain practices such as the solidarity system as being rather homogeneous and intertwined between ethnies. Smith (2006) describes the strong national unity in Senegal where a set of jokes and privileged relationships rise from ethnicity across groups. For instance Serere and Diola have common imaginative history as do Serere and Diola. Nevertheless I have to point out the existence of the Diola independentist mouvement in the Casamance region which could potentially distort this national unity and thereby the structure of my variable of observation through conflict. At the moment of the survey, in 2010, peace treaties had been signed in 2004 maintaining a relative stability in the region.

Nevertheless my results have to be taken with caution as I cannot control for household particularism or in other words, the heterogeneity of my observed data. Indeed I cannot add household fixed effects as the first wave of the survey lacks quality information on money transfers. Therefore I will have to assume that these unobserved variables are controlled for which is a strong assumption.

6 Results

6.1 Baseline Specification

I start by showing the OLS baseline regressions here. Table 8 shows the results for estimating equation (1) for the different cohorts I decided to consider. Although these OLS regressions do not provide any causal evidence, they reveal a relationship between transfers and education similar to the one I predicted in my theoretical background. Indeed although there doesn't seem to be any specific correlation when I consider the entire sample of children, breaking down my regression by gender unveils the necessity to consider the variations of transfers at a household level as a the result of a heterogenous process.

Table 8 reports the OLS estimations for both transfers and their logarithmic transformation which enables me to reduce the noise in my observation of annual transfers and get a smoother registration of variations. When I consider the entire sample, I do not get any robust correlations to a logarithmic transformation, suggesting there is no strict equation between the process of education and transfers, but rather that it could depend on a more specific bargaining process. Indeed it seems that girl's primary education is positively and significantly correlated to the level of transfers realized, whereas boy's on the contrary tend to reduce the level of transfers sent. These results are robust to the logarithmic transformation. Nevertheless I do no observe any significative correlations for the secondary cycle.

In order to compare girls' education to boys', this first set of regressions only considers the correlations of education on transfers when there are both genders of the same age group in the household. This could mean that girls' education is a signal of wealth only if their brothers are already sent to school. Regression $(2)(c)$ in table 8 suggests that the higher the ratio of boys getting a primary education is, the less the household sends transfers. On the contrary if none go to school, the level of transfers sent when girls go to primary school will not be tempered. To see if girls' education is considered relatively to that of boys I run a new set of regressions considering boys and girls in households where there are no siblings of the opposite sex in the same age group.

Table 8: Baseline Specification, OLS regression

	(1) Primary 3-10	(2) Primary 3-14	(3) Secondary 10-14	(4) Secondary 10-18
All				
(a) Transfers	101346	81134	52280	79771**
SE	(64007)	(56722)	(43890)	(31981)
Obs.	774	838	660	768
R^2	0.265	0.220	0.258	0.248
(b) Log Transfers	0.320**	0.160	0.138	0.075
SE	(0.150)	(0.152)	(0.237)	(0.183)
Obs.	765	829	653	759
R^2	0.378	0.354	0.327	0.322
Distinction by Sex				
(c) Transfers				
Girls	109756**	129199***	193790	177046
SE	(52164)	(39612)	(171256)	(140481)
Boys	-36136	-92796**	-208843	-11626
SE	(64510)	(46878)	(239422)	(120050)
Obs.	385	508	62	188
R^2	0.430	0.395	0.851	0.521
(d) Log Transfers				
Girls	0.448**	0.416**	0.460	-0.156
SE	(0.191)	(0.189)	(0.745)	(0.412)
Boys	-0.024	-0.226	-1.496	-0.043
SE	(0.197)	(0.196)	(1.021)	(0.419)
Obs.	383	503	62	187
R^2	0.440	0.417	0.777	0.532

Table 9 shows that when there are no boys in the household between ages 10 to 14, there is a significant, at the 10% level, (and robust to log transformation) correlation between girls having a secondary education at the regular age (10-14) and the household's transfers. Interestingly the effect is ambiguous for primary education for girls but overall there is no correlation for boys. This is consistent with the idea that the expected returns to a girl's education are lower than those of a boy's which implies that investing in girls education is more likely to be considered a signal of wealth. In addition a girl's educa-

Table 9: Girls & Boys without Siblings of the Opposite Sex , OLS regression

	(1) Primary 3-10	(2) Primary 3-14	(3) Secondary 10-14	(4) Secondary 10-18
Girls				
(a) Transfers	36713	89630*	190836*	84926
SE	(41164)	(47701)	(115185)	(56467)
Obs.	197	175	162	223
R^2	0.623	0.436	0.478	0.499
(b) Log Transfers	0.509*	0.435	0.679*	0.227
SE	(0.301)	(0.325)	(0.347)	(0.326)
Obs.	191	172	162	220
R^2	0.450	0.426	0.439	0.373
Boys				
(c) Transfers	250810	188585	-46714	-52053
SE	(225482)	(218330)	(74719)	(46877)
Obs.	192	155	123	159
R^2	0.285	0.308	0.588	0.574
(d)Log Transfers	0.083	0.106	-0.732	-0.516
SE	(0.326)	(0.449)	(0.480)	(0.379)
Obs.	191	154	121	157
R^2	0.479	0.412	0.452	0.535

	(1) Transfers	(2) Log	(3) Transfers HHH	(4) Log HHH
Table 10: Instrumented Regressions				
Primary 3-10	46819	0.754	-208563	0.197
SE	(516893)	(2.219)	(337699)	(2.327)
No Bride Price	95694*	0.252	84999**	0.330
HH Female Ratio	34140	0.164	70099	0.133
Obs.	695	680	585	572
F	2.898	3.169	2.994	3.289
Primary 3-14	230026	1.589	-43096	0.735
SE	(467681)	(1.888)	(291060)	(1.959)
No Bride Price	71682*	0.219	58204*	0.247
HH Female Ratio	-13247	-0.118	35615	-0.153
Obs.	762	746	640	627
F	4.319	5.440	4.208	5.188

tion seems to be in competition with a boy's. In the absence of competition, when there are no rival boys of the same age, a girl's education is less likely to signal wealth than in the presence of a rival. This can be particularly true if she goes to primary school, which is a rather common practice but maybe less true if she goes to secondary school. However since educational decisions may be endogenous to transfer decisions, I now instrument my regression in the following section.

6.2   Instrumented Specification

In accordance with my empirical strategy, I get the following estimates for equation (2). Table 10 presents the results of the instrumented education on the following four dependent variables: transfers granted by the household and transfers granted by the head with their respective logarithmic transformation. Indeed if I consider that the demand for transfers addressed to the household increases then it is likely that the ones addressed to the head will also increase because I consider the head is representative of this entity and also the main education decision maker.

Consistent with Ashraf & al's demonstration, table 11 shows that although non bride price practicing ethnies increase the general attendance to primary school, bride price practicing ethnies increase girl's attainment more than boys. On the contrary, I find no effect at the secondary level and therefore cannot instrument the impact of secondary education on transfers. It is also good to note that this instrument does not resist to the addition of the number of fostered children by the household.

Now, using this positive variation of primary education, I observe its influence on transfers. It appears that there is no significant effect of this difference and difference estimation on transfers. Specifically my second step regression is not robust to the addition of the variable "bride price ethnic groups" which implies that it is possible that at least one of the assumptions made in section 5 does not hold. Nevertheless I cannot reject the hypothesis that education is a signal of wealth, potentially leading to taxation and underinvestment. Indeed in the absence of this variable the level of transfers are positive and significant when children go to primary school. These results also stand for the level of transfers sent by the head and to their respective logarithmic transformation.

Different elements can explain this absence of correlation when the "bride price" variable is added. First, it is possible that families that educate more girls have certain characteristics that also influence the level of transfers sent. Ethnic groups not practicing the compensation, reduce education's explanatory power and have a higher level of transfers, significant, at the 10% level, which could mean we have not entirely controlled for endogeneity. This can be due to a specific bargaining process within these groups which, each, represent a specific decisionary unit. Also the second assumption could not hold. People can know the reasons for investing more in a girl's education and change their demand for transfers because they do not consider such an education is a signal of wealth. This increase in education would not lead to a change in transfers. Eventually, these results could be because I lack sufficient statistical power. The frequency of the (ethnicity*female ratio) may not be high enough to induce a significant change in transfers or the sample size may be too small to seize such a precise variation in transfers.

Table 11: First Stage Regressions

	(1) Transfers	(2) Log	(3) Transfers HHH	(4) Log HHH
Primary 3-10				
Ethny no bride price	0.142***	0.148***	0.177***	0.186***
Female ratio	0.191***	0.195***	0.196***	0.205***
Ethny NBP*female ratio	-0.137*	-0.146*	-0.150*	-0.160*
Constant	0.323*	0.237	0.066	0.031
Obs.	695	680	585	572
R^2	0.259	0.262	0.277	0.285
Primary 3-14				
Ethny no bride price	0.142***	0.153***	0.181***	0.194***
Female ratio	0.214***	0.224***	0.210***	0.230***
Ethny NBP*female ratio	-0.169**	-0.194**	-0.182**	-0.206**
Constant	0.289*	0.185	0.067	0.034
Obs.	762	746	640	627
R^2	0.260	0.263	0.269	0.274
Secondary 10-14				
Ethny no bride price	0.044	0.062	0.031	0.060
Female ratio	0.055	0.056	0.010	0.014
Ethny NBP*female ratio	-0.057	-0.066	0.019	0.0007
Constant	-0.313	-0.395	-0.246	-0.352
Obs.	389	386	330	327
R^2	0.389	0.389	0.426	0.429
Secondary 10-18				
Ethny no bride price	0.071	0.068	0.051	0.060
Female ratio	-0.043	-0.044	-0.065	-0.061
Ethny NBP*female ratio	-0.029	-0.015	0.021	0.028
Constant	0.151	-0.040	0.012	-0.209
Observations	586	574	490	481
R^2	0.346	0.351	0.367	0.364

7   Conclusion

This paper provides a first set of evidence that solidarity systems in Senegal may have a negative influence on the education of children, girls' specifically. I find some relatively weak evidence that education may lead to higher transfers.

My ordinary least square regressions show households sending their girls below 14 years old to primary school make a higher level of transfers, suggesting that people use the observation of such an education to bargain for additional help and transfers. Interestingly in the absence of rival boys of the same age group, the effect is ambiguous for primary education and positive for secondary education confirming the idea that there can be a large set of signals and suggesting that, in the absence of a boy, girls' education is more highly valued because it is only at the secondary level that girl's education leads to an increase in transfers.

My difference-in-difference instrumentation which uses the fact that some groups decide to send more their girls to primary school because they get a higher return from it, unfortunately, does not confirm the causal reason to this pattern. Nevertheless I cannot reject the idea that education is a signal of wealth. Rather it is possible that my instrument is not an effective tool. The difficulty of instrumenting here is that households have to remain decision makers for the signal to work. This excludes all perfectly exogenous instruments. More specifically, in my instrumentation, different forces are at hand: families that educate more girls may have certain characteristics that also influence transfers or it could be that I do not have enough statistical power to bring causal proof. The question thus remains to see if communities tax education.

I believe it could be interesting to further investigate this relationship as my idea speaks to a growing literature on the influence of solidarity systems on investments. In particular this article suggests that money transfers can introduce an additional entry cost to education which could lead to some households underinvesting in it. Because my empirical strategy is rather difficult to implement here it could be interesting to unveil the heterogeneity

of the demand for transfers independently of an instrument by playing, for instance, with the fact that children's level of education is observed or not.

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9   ANNEX

9.1   ANNEX 1- Labour Income and Expenses

A. Labour Income Quintiles

B. Expenses Quintiles
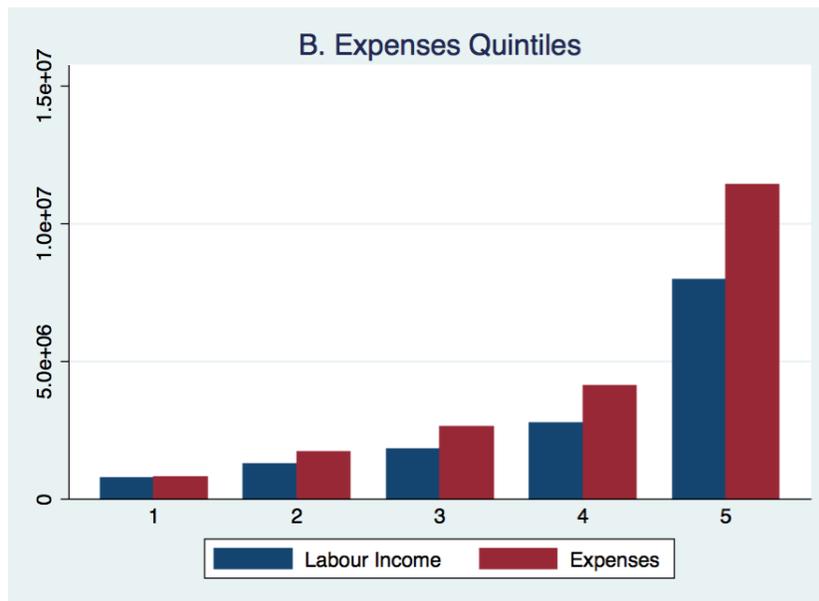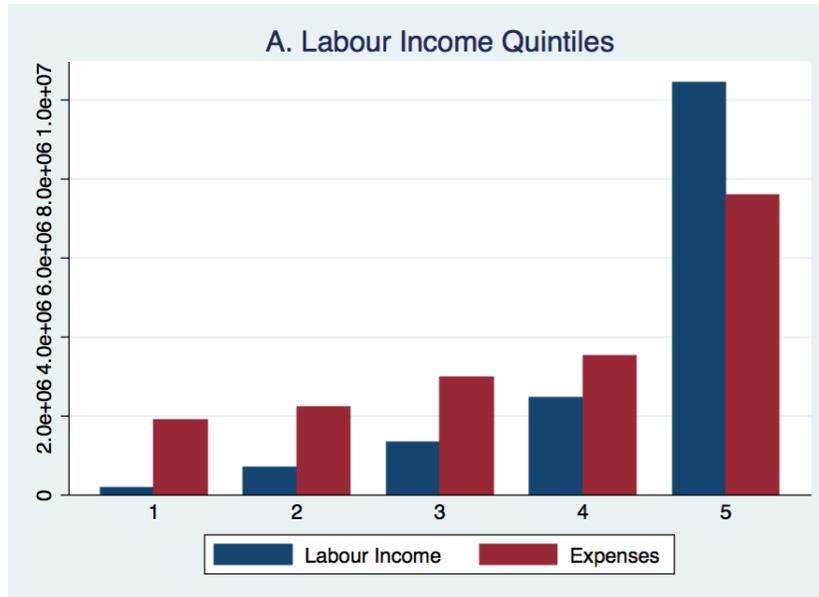
9.2 ANNEX 2- Tuition Fees

A.Transfers Received by Gender

| | Gender | | | |
| | Man | | Woman | |
	No.	Row %	No.	Row %
Object of the Transfer				
Education	135	65.5%	71	34.5%
Financial Problems	1,865	61.3%	1,177	38.7%
Health	127	62.6%	76	37.4%
Pilgrimage to Mecca	2	7.7%	24	92.3%
Other Pilgrimage	4	23.5%	13	76.5%
Travel	117	51.3%	111	48.7%
Mariage	585	22.0%	2,078	78.0%
Baptism	905	22.6%	3,105	77.4%
Dowry	13	40.6%	19	59.4%
Funerals	307	38.6%	489	61.4%
Other celebration	367	28.6%	918	71.4%
Gift for another reason	2,360	40.6%	3,455	59.4%
Adiya	644	67.4%	312	32.6%
Savings	2	66.7%	1	33.3%
Other	494	70.9%	203	29.1%
Total	7,927	39.7%	12,052	60.3%

B. HH Member in charge of Tuition Fees

Tuition Fees	No.	Col %
Household Head	3,593	55.3%
Other HH Member	1,655	25.5%
Other Non HH Member	1,028	15.8%
Abroad	219	3.4%
Non Tuition Fees	7	0.1%
Total	6,502	100.0%

C. Non HH Member's link to the Head

Non HH Member's Link to the Head	No.	Col %
Wife/Husband	271	22.1%
Biological Child	272	22.2%
Brother/Sister	142	11.6%
Other Link	356	29.1%
No Link	184	15.0%
Total	1,225	100.0%

9.3   ANNEX 3- Type of Transfers by Income Quintile

	Revenu distribution									
Object of the Transfer	**1**		**2**		**3**		**4**		**5**	
	No.	Col %	No.	Col %	No.	Col %	No.	Col %	No.	Col %
Education	31	0.8%	43	1.0%	28	0.7%	45	1.2%	59	1.5%
Problemes Financiers	396	9.6%	580	13.9%	562	14.6%	728	18.9%	779	19.6%
Sante	29	0.7%	46	1.1%	39	1.0%	41	1.1%	48	1.2%
Pelerinage a la Mecque	1	0.0%	9	0.2%	6	0.2%	4	0.1%	6	0.2%
Autre Pelerinage	4	0.1%	4	0.1%	1	0.0%	5	0.1%	3	0.1%
Deplacement	50	1.2%	39	0.9%	43	1.1%	36	0.9%	60	1.5%
Mariage	686	16.7%	618	14.8%	506	13.1%	473	12.3%	380	9.5%
Bapteme	1,016	24.7%	878	21.0%	777	20.1%	743	19.3%	596	15.0%
Dot	10	0.2%	6	0.1%	5	0.1%	7	0.2%	4	0.1%
Funerailles	249	6.1%	166	4.0%	151	3.9%	100	2.6%	130	3.3%
Autre ceremonie / Fete	207	5.0%	275	6.6%	302	7.8%	237	6.2%	264	6.6%
Cadeau pour Autre Raison	1,100	26.8%	1,105	26.4%	1,113	28.8%	1,176	30.6%	1,321	33.2%
Adiya	186	4.5%	225	5.4%	202	5.2%	136	3.5%	208	5.2%
Epargne	1	0.0%	0	0.0%	2	0.1%	0	0.0%	0	0.0%
Autres (a preciser)	146	3.6%	188	4.5%	122	3.2%	115	3.0%	126	3.2%
	0	0.0%	1	0.0%	0	0.0%	0	0.0%	0	0.0%
	0	0.0%	0	0.0%	0	0.0%	1	0.0%	0	0.0%
Total	4,112	100.0%	4,183	100.0%	3,859	100.0%	3,847	100.0%	3,984	100.0%