

What Should I Aspire to? Peer Effects in Adolescents' Friendship Networks

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Abstract

In sub-Saharan Africa, economic aspirations, and the aspiration to comply with traditional social obligations often conflict with one another, and adolescents may be strongly influenced by their friends when deciding which one to prioritize. To identify potential peer effects on the extent to which adolescents prioritize economic aspirations, we elicit the preferences and perceived competition between economic and social aspirations of 553 high school students in Uganda, as well as the friendship ties among all classmates. Using characteristics of non-overlapping friends as instrumental variables, we identify a strong peer effect on individual aspirations. The effects are stronger with more social interaction among friends, or when the information shared is more relevant, or more important relative to other signals. We find no peer effect on the perceived competition between aspirations.

Keywords: aspirations; adolescents; peer effects; friendship networks; non-overlapping peers

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1. Introduction

Nearly 90% of youngsters aged 10-24 live in a developing country (UNICEF 2018; UNFPA 2019), and in developing countries, young people form the majority of the population (Castañeda et al. 2016). Adolescence is the time in life when most people form aspirations – defined as mid-term life goals that are realistically achievable –, which could have an important influence on their future economic and social well-being. Given constraints in longevity and economic resources, and incompatibilities between aspirations, most young adults face a trade-off between aspirations.

In sub-Saharan Africa, the aspiration to become economically independent by having individual income-generating activities is very important for adolescents. However, such economic aspiration often competes with aspirations *in the social domain* in the following ways. First, it is traditionally expected that earnings are shared with relatives, and as widely documented such “kinship tax” weakens incentives for economic activities (Platteau 2000; Di Falco and Bulte 2011; Hadnes, Vollan, and Kosfeld, 2013).¹ Second, when taking up economic opportunities young people often need to be mobile and (ready to) migrate, which affects their ability to live in proximity with relatives or friends (Bech, Kristensen and Birch-Thomsen 2013). Third, economic autonomy may also compete with local community engagement. While community engagement may help to obtain access to productive assets and land, which are important to start an agricultural business, a growing number of young people turn away from farming and rural life more generally (White 2012). The aspiration of economic autonomy outside agriculture may be more difficult to combine with community engagement, which remains very important in rural societies. As a result, future economic activities might be held back by the social aspirations of 1) maintaining peaceful relations with relatives, 2) living in proximity of relatives or friends, and 3) engaging in local community activities, respectively.

We expect that adolescents at some point realize that future economic activities might be held back by these aspirations in the social domain, and that they need to decide which aspirations to prioritize. What aspirations they prioritize is likely to influence how they allocate time, effort, and resources, to achieve the prioritized aspirations. As their decision might have important consequences for their future economic and social well-being, it is important to understand what influences their decision. Adolescents spend a large part of their time at school where they interact with peers who face similar trade-offs. They have conversations about their future and ambitions, and away from their communities and relatives they are free to share concerns about the trade-offs they face between economic and social aspirations. We therefore

expect strong peer effects among school friends on the extent to which they prioritize economic aspirations vis-a-vis the described aspirations in the social domain.

To investigate such peer effects, we elicited the preferences between economic and social aspirations of a sample of high school students. For this, the respondents were presented pairs of economic and social aspirations. For each pair they were asked to what degree they considered the paired aspirations as ‘competing’. This allows testing a key assumption of the respondents’ choice structure. They were also asked to indicate their preference between the paired aspirations, by allocating ten tokens between them. To investigate the extent to which aspirations are influenced by the aspirations of friends, we collected data on the friendship ties between the respondents and all their classmates. To identify peer effects in friendship networks, we used characteristics of ‘non-overlapping’ friends as instruments for friends’ preference between the paired aspirations (following the approach developed by Bramoullé, Djebbari, and Fortin (2009) and De Giorgi, Pellizzari and Redaelli (2010)).²

Our results can be summarized as follows. First, most students perceived the paired aspirations as competing, which confirms a key assumption of the choice structure that our respondents face. Second, most respondents had a clear preference for one of the aspirations in each pair. We also found a slight preference for economic aspirations when paired with the aspiration of living in proximity of friends/relatives, or the aspiration to engage with the local community, but not when paired with the aspiration of having peaceful relations with relatives. Third, we identified a strong peer effect in two of the three pairs of aspirations. Specifically, friends have a strong effect on the extent to which adolescents prioritize economic aspirations when paired with the aspiration of having peaceful relations with relatives, and when paired with the aspiration to engage with the local community. We are unable to test for peer effects on the extent to which adolescents prioritize economic aspirations when paired with living in the proximity of family/friends due to a problem of weak instruments with this pair. Fourth, we find that the peer effects are stronger with more social interaction among friends, and when the information shared is more relevant or more important relative to other signals. Fifth, we find no peer effect on the perceived competition between aspirations.

Our study is related to the following two strands of literature. First, the role of aspirations has received growing attention among development economists. Dalton et al. (2016) and Genicot and Raj (2017) model the influence of aspirations on effort and investment, respectively. They use aspirations as reference points in a utility framework. In the model of Genicot and Raj (2017), equilibrium predictions crucially depend on whether aspirations are social determined. Recent studies provide evidence that supports that aspirations are indeed

socially determined. Bernard et al. (2019) found in Ethiopia that watching a documentary about successful people from similar communities increases parents' educational aspirations and investments for their children. Beaman et al. (2012) demonstrated that female leadership increases adolescent girls' career aspirations in India. Macours and Vakis (2014) used geographical proximity and communication patterns to analyze the role of social interactions in shaping aspirations in Nicaragua. They found that local leaders influence households' capacity to aspire, which increases productive investments.³ Our contribution to this literature is twofold. We focus on the influence of 'peers' rather than leaders or role models on the formation of aspirations.⁴ In addition, while the above-mentioned studies consider potential trade-offs between aspirations, they do not test the extent to which they are competing, and how this affects the influence of peers on the extent to which specific aspirations are prioritized over others.

Second, a large number of studies analyzes the influence of classmates on individual behavior (Arcidiacono et al. 2012; Cohen-Cole and Fletcher, 2008; De Giorgi et al. 2010; De Paola and Scoppa 2010; Feld and Zölitz 2017; Fortin and Yazbeck 2015; Lin 2010; Patacchini and Zenou 2012; Powell, Tauras and Ross, 2005), and a growing number investigate peer effects in social networks (Bramoullé et al. 2009; Cingano and Rosolia 2012; Goldsmith-Pinkham and Imbens 2013; Bursztyjn et al. 2014; Lindquist, Sauermann, and Zenou 2015). However, no studies look at peer effects in networks on the choice between competing aspirations, which we do in our study.⁵

The findings of this paper have important societal and policy relevance. Adolescents might fail to take up economic opportunities if their economic aspirations are subdued due to competing social aspirations. Programs that aim to stimulate adolescents' economic aspirations can exploit social networks to create a multiplier effect, so that a large impact can be generated by targeting only a limited number of adolescents. As we did not find any peer effects in the perceived competition between aspirations, we do not expect that social networks can be used to reduce tensions between economic and competing social aspirations. To reduce these tensions, policies should be considered that increase mobility and support young people who want to start up agricultural businesses.

The rest of the paper is structured as follows. In Section 2, we present our research design, which includes a theoretical framework and the methods used. Section 3 presents descriptive statistics while Section 4 describes the identification strategy. In Section 5 we present the regression results, including robustness tests and a heterogeneity analysis. Section 6 discusses the results and concludes.

2. Design

In this section, we present the study design. We start with a theoretical model that uses the choice structure used in the elicitation of the aspirations, and how we expect peer effects to influence them. It also presents the study population and sample, and the methods to elicit individual aspirations and friendship ties.

2.1. Theoretical framework

To model the formation of individual aspirations and how they are influenced by peers, we assume that adolescents set mid-term life goals by maximizing a utility function $u_i(y_i)$. They do this by choosing $y_i \in [0,1]$, i.e., the weight assigned to aspiration A relative to aspiration B. In other words, the utility function measures the future utility (discounted to the present) that individual i obtains when he/she reaches the combination of goals as weighted by y_i . Applying this to our setting, we assume that aspirations A and B refer to economic aspirations and aspirations in the social domain, respectively.

To model the influence of peers in friendship networks on the weight assigned to competing aspirations, we assume that utility is lower the more one's aspirations deviate from the aspirations of friends. We assume that adolescents discuss their aspirations with their friends and adjust their aspirations in the direction of the aspirations of their friends. There might be several mechanisms responsible for this peer effect. One of the most important ones relates to conformism, i.e., the willingness to conform to the aspirations of friends.⁶

To formalize this, we assume there is a population of n individuals who are connected by friendship ties as captured by the $n \times n$ adjacency matrix $\mathbf{G} = [g_{ij}]$, where $g_{ij} = 1$ if individual i considers that individual j is a friend, and $g_{ij} = 0$ otherwise.⁷ We also exclude the possibility of self-loops, i.e. $g_{ii} = 0$. The set of i 's friends is denoted as $N_i = \{j \neq i | g_{ij} = 1\}$. The size of N_i is then $g_i = \sum_{i \neq j}^n g_{ij}$, and assuming that there are no isolates (i.e., everyone has at least one friend) $g_i > 0$. We assume that each individual i maximizes the following utility function:

$$U_i(y_i, y_{-i}; \lambda, \mathbf{G}) = u_i(y_i) - \lambda_i \left(y_i - g_i^{-1} \sum_{i \neq j}^n g_{ij} y_j \right)^2 \quad (1)$$

The first term, $u_i(y_i)$, measures the individual utility obtained from the weight assigned to aspirations A and B without peer influence, as explained above. The second component reflects the disutility of deviating from the mean aspiration weights of friends, captured by

$g_i^{-1} \sum_{i \neq j}^n g_{ij} y_j$. The parameter $\lambda_i > 0$ reflects the strength of the behavioral influence of the deviation from others' choices, and the larger this parameter the more this second component influences the weights individual i assigns to aspirations A and B.

As each individual i has individual-specific networks, the second term is heterogeneous. For a given λ_i , the utility of individual i decreases with the deviation from the mean weight assigned to aspiration A of the individual-specific network of friends of individual i . Using the first-order condition of utility maximization, the optimal y_i^* is obtained by fulfilling the following condition:

$$u_i'(y_i^*) = 2 \lambda_i \left(y_i^* - g_i^{-1} \sum_{i \neq j}^n g_{ij} y_j \right) \quad (2)$$

We distinguish the following two cases.

Case 1: $u_i''(.) = 0$

An increase (decrease) in the average weight given to A by the friends of individual i decreases (increases) the right-hand side of equation (2). To maintain the equality of equation (2), y_i^* needs to increase (decrease). In other words, the peer effects change the weight individual i assigns to A and B in the direction of the average weight among his/her peers.

Case 2: $u_i''(.) < 0$

Under this assumption, a change in y_i^* also changes the left-hand side of equation (2). This weakens the peer effect but does not remove it. Again, the right-hand side decreases (increases) with a higher (lower) mean weight given to A by the friends of individual i . To maintain the equality of equation (2), y_i^* needs to increase (decrease) which increases (decreases) the right-hand side. However, as it also decreases (increases) the left-hand side, the required change in y_i^* is smaller than in case 1. In sum, in both cases, the average weight assigned to A by the friends of individual i has a positive influence on the weight individual i assigns to A.

Two further notes are important to consider when we empirically test this model. First, note that the choice structure in our theoretical model assumes that aspirations A and B are competing. In other words, we assume that both aspirations cannot be fully achieved at the same time, and that an increase in the weight assigned to one of them comes with a decrease in the weight assigned to the other one. One might argue, however, that it is possible that aspirations

are independent or even complementary. Whether the assumption of competing aspirations holds is an empirical matter, which we will test in the empirical section.

Second, our model allows for the possibility that λ_i varies across subjects. If we assume that λ_i is a function of a set of individual characteristics X_i , such that $\lambda_i = f(X_i)$, we can develop more specific predictions about the mechanisms behind the peer effects. It is plausible that the strength of the peer effect increases with the amount of information transmitted, the extent to which the information is relevant to the receiver, and the importance of the information relative to competing sources of information. The strength of each of these mechanisms might depend on individual characteristics. For example, peer effects might be stronger among students who participate in extra-curricular activities as they have more social interaction and hence receive more information. In the empirical section, we will identify a set of individual characteristics that we expect to correlate with these more specific mechanisms. We next summarize the main predictions.

Prediction 1: *The weight assigned to A by the friends of individual i has a positive influence on the weight individual i assigns to A.*

Prediction 2: *We expect important heterogeneity in the strength of this peer effect along individual characteristics of the receiver that influence the amount and relevance of the information shared by peers.*

2.2. Study population and sample

For this study, we selected the urban Mbale district and rural Sironko district in eastern Uganda. In this region, one third of the population lives below the nationally defined poverty line based on the cost of caloric needs and non-food needs. Almost half of the population is younger than 14 years old, and 60% is working in subsistence agriculture, which includes farming coffee beans, maize, sweet potato, and bananas (Uganda Bureau of Statistics 2017, 2018). The population density is the second highest in the country (Uganda Bureau of Statistics 2016).

We use a sample of sixth form students from a random selection of secondary schools in both districts. We choose sixth form high school students, for the following reasons. First, they are the most senior students in the Ugandan high school system, expected to be contemplating long-term, future-impacting life decisions like marriage, employment, further education, etc. At the same time, and in contrast to many of their non-school going peers, they have not made such decisions yet. This ensures that the elicitation of preferences between aspirations is not

biased by any accomplishments or decisions they have made in the past – for example via post-rationalization. Second, as students are physically present at school most of their time, they tend to interact more frequently with fellow students than with non-school going peers. We can therefore assume that many (if not most) of their friends come from their school (Gaviria and Raphael 2001). Third, friendship networks within a school class are relatively stable and have clearly defined boundaries. This is important, as our identification strategy requires information on the full network, for which we need to interview all nodes in the network. Working with students who can be convened at school has obvious advantages in terms of recruitment.

The sampling was organized as follows. In a first step, we randomly selected eleven classes from a list of sixth form classes provided by local officials in both districts. We imposed a minimum class size of 30 students and to keep the elicitation of friendship ties manageable (respondents were asked to go through the entire list of classmates to identify their friends) we removed classes with more than 125 students from the sampling frame. These selection criteria generated a sampling frame of 8 sixth form classes in rural Sironko and 24 senior sixth form classes in urban Mbale, from which we randomly selected six classes in Sironko and five classes in Mbale.⁸ In a second step, we recruited all students in each of the eleven selected classes, which resulted in a total sample of 572.⁹

2.3. Elicitation of aspirations and friendship ties

To elicit aspirations, we organized two phases of fieldwork. In the first preparatory stage, we conducted 38 open-ended interviews with young men and women in the urban Mbale district and the rural Sironko district to obtain insights into potential trade-offs among aspirations. We purposively selected respondents from rural and urban areas, ranging from young teenagers to older adolescents.¹⁰ Respondents were asked how they would define aspirations, what aspirations they had, and what trade-offs they thought existed among their aspirations. From their responses, we learned that economic aspirations were very important to them. They revolved around accumulating wealth (e.g., owning a house, a motorbike, land), but also around obtaining autonomy, and not having to rely on others. Aspirations that competed with these economic aspirations included issues of peaceful relations with relatives, community engagement, marriage and fertility, and education. Respondents explained how they had to choose between economic aspirations and these alternative aspirations, and they referred to peers who had been struggling with this.

In a second stage, we developed a questionnaire. Guided by the evidence obtained in the first phase of the fieldwork, we created pairs of aspirations that we expected to be *competing*

with one another. We used this questionnaire to elicit the individual preferences between competing aspirations of a sample of students. The respondents were asked to allocate ten tokens between the two aspirations in each pair, and to allocate more tokens the stronger they preferred one aspiration to the other (see Appendix C for the exact formulation of the questions). As a result, responses capture which aspiration is preferred over the other, as well as the intensity of the preference. The use of ten tokens results in a response scale of eleven categories, which delivers good measurement validity for graded comparisons (De Beuckelaer, Toonen, and Davidov 2013). The technique does not force respondents to choose between aspirations, allowing indifference as a response option.¹¹

The questionnaire also elicited the students' perceived degree of competition between the paired aspirations, using a five-point Likert scale ranging from completely disagree (1), to completely agree (5). We use this information to test the assumption that the paired aspirations are competing. Note that the selection of aspirations and how they are paired was based on the evidence collected with a limited number of open-ended interviews and that proper scrutiny of the assumption that they are competing is required. This is important, as the preference elicitation might not be accurate, if respondents think they could achieve both aspirations in a pair.¹²

To identify potential peer effects on the extent to which adolescents prioritize economic aspirations over competing aspirations in the social domain, we elicited friendship ties using an exhaustive list of classmates. Students were asked to indicate whom of their classmates they considered friends by putting marks behind their names.¹³ We did not impose a limit on the number of friends, so that we could capture the entire friendship network of each respondent.

The questionnaire was self-completed in an interview room at the school. We did not let more than six participants in this room at the same time. After a participant completed the questionnaire, a new respondent was called. Survey questions were posed in English, and participants took approximately 90 minutes to answer all questions. Two Ugandan assistants called participants into the interview room and provided instructions and assistance when requested.

3. Descriptives

To obtain a first idea of the variation and correlations of the main variables of interest, we present a set of descriptive statistics. After a description of socio-economic characteristics of the participants, we look at the elicited aspirations, and how they correlate among friends. We also test whether the aspirations are competing within the different pairs.

3.1. Socio-economic characteristics

To investigate peer effects in friendship networks on the choice between competing aspirations, we elicited the friendship ties of all 572 subjects. 6,092 out of 33,432 potential ties are reported to be friendship ties (18%). This implies that a participant nominates on average 11 friends. Figure A.1 in the Appendix presents the distribution of the number of nominated friends in the sample and Figure A.2 does so per class, given that class sizes differ greatly. We removed 19 subjects (3%), because they did not have any friends (18) or had friends but no indirect friends who are not direct friends, i.e., so-called ‘non-overlapping friends’ (1). We did so, as our identification strategy (presented in the next section) relies on a set of non-overlapping friends. All remaining subjects in the sample have at least one non-overlapping friend. This leads to a sample of 553.¹⁴

Table 1. Descriptive statistics of socioeconomic characteristics

Variable	Mean / percentage
Mbale residence (urban)	58%
Female	38%
Total number of siblings	6.24 (3.56)
Both parents have low levels of education	23%
Both parents alive	72%
Bagisu tribe	70%
Born again religion	26%
Islam religion	18%
Takes care of children / elderly / sick in household	40%
Engages in sports as extracurricular activity	67%
Has boy/girlfriend	54%
TV as most important source of news	22%
Internet as most important source of news	20%
Business as most important economic activity of father	19%
Business as most important economic activity of mother	16%
Farming as most important economic activity of father	33%
Farming as most important economic activity of mother	34%
Salaried job as most important economic activity of father	16%
Salaried job as most important economic activity of mother	10%
Percentage of students in class reported as friends	19.83 (17.48)
Number of friends	11.02 (10.6)

Notes. N = 553. Standard deviation between parentheses.

Table 1 presents important socioeconomic characteristics of the 553 subjects in the sample. More than half of the subjects live in Mbale. Girls represent 38% of the sample. On average,

participants have more than six siblings. 23% of the subjects have a mother and father who attained no formal education or only primary education, which we label as ‘low levels of education’. 70% of the subjects belongs to the Bagisu tribe, 40% reports that they take care of children, elderly or the sick in the household. Moreover, 26% identifies as born again Christian and 18% as Muslim. Most students (67%) engage in sports as an extracurricular activity at school, and more than half of the subjects have a boy- or girlfriend. 72% still have both parents alive. The table also reports on some sources of news, which we will later use to control for exposure in the analyses. In terms of employment one third of the students report that farming is the most important income generating activity of their father, followed by running a business (19%) and salaried employment (16%). 34% also indicate that their mothers are involved in farming as most important income generating activity, followed by running a business (16%) and salaried employment (10%).¹⁵

3.2. Aspirations and perceived competition

Table 2 presents statistics on the weights given to the aspirations in each pair as well as the perceived competition between the paired aspirations. The first column presents the mean perceived level of competition in each pair. Using a t-test, we find that the mean scores in the three pairs are significantly larger than 3, which was labelled ‘neither agree nor disagree’ in the questionnaire. This confirms our assumption that adolescents consider the pairs of aspirations as competing.

To test whether the respondents have a clear preference for one of the aspirations in a pair, we look at the mean outspokenness per pair of aspirations, measured as the absolute distance from the indifference point of five. The results are presented in the second column. Using a one-sided t-test, we find that in all three pairs the mean outspokenness is significantly higher than zero. This indicates that on average respondents have a clear preference in each pair.

The third column presents the mean aspiration weights. Note that only the weight referring to the first aspiration in each pair is presented (i.e., the aspiration of ‘economic independence’), as the graded paired comparison technique makes that the scores of the paired aspirations correlate perfectly. Using a two-sided t-test, we find that in the second and third pairs the mean weight is statistically different from the indifference point of five. The results indicate that the subjects in our sample tend to prefer economic independence to community engagement and proximity to family and friends. Figure A.3 in Appendix A provides more details on the distributions of the aspiration weights, competition, and outspokenness for the three pairs.

In an additional analysis, we look at the correlations between perceived competition and outspokenness. We expect that the more one perceives the aspirations in a pair as competing, the more outspoken one is in one's preference for one of the two aspirations in a pair. Put differently, if an individual considers that both aspirations in a pair are not competing (i.e., that the attainment of both aspirations in a pair is perfectly possible), weighting both aspirations becomes less meaningful. These correlations might be important as they would support that the elicited preferences are less accurate with lower perceived competition between the paired aspirations. An alternative hypothesis may suggest that when two aspirations are perceived as more competing, one is less willing to express a preference for one aspiration over the other. Pursuing one aspiration at the expense of the other could have adverse effects for the pursuit of the other aspiration, given that they both compete for time, effort, and resources. However, the results support our initial hypothesis that more competition results in more outspokenness. The fourth column in Table 2 presents the correlation between the perceived level of competition and the outspokenness in each pair. We find a significant, positive correlation between the perceived level of competition and the level of outspokenness in the first and second pair of aspirations.

Table 2. Competition, aspiration weights and outspokenness

Pair of aspirations	(1) Level of competition (mean) ^a	(2) Outspokenness (mean) ^b	(3) Aspiration weight (mean) ^c	(4) Competition – outspokenness ^d	(5) Competition – aspiration weight ^d
1. Econ. indep. – peaceful relations relatives	3.55*** (1.21)	1.68*** (1.38)	5.14 (2.17)	0.101**	0.017
2. Econ. indep. – proximity family/friends	3.44*** (1.22)	1.76*** (1.29)	5.32*** (2.16)	0.159***	0.127***
3. Econ. indep. – community engagement	3.67*** (1.17)	1.81*** (1.23)	5.48*** (2.13)	0.048	-0.056

Notes. N = 553. * p < 0.1, ** p < 0.05, *** p < 0.01. Standard deviations in parentheses. ^a Ranges from 1 (fully disagree) to 5 (fully agree) with the statement that both aspirations are competing. One-sided t-test, with H₀: mean score = 3, H_a: mean score > 3. The alternative hypothesis focuses on one side of the distribution as we expect respondents to find the aspirations competing. ^b Measured as the absolute distance from an aspiration score of 5, where respondents are indifferent between both aspirations. This measure ranges from 0 to 5. We use a one-sided t-test, with H₀: outspokenness = 0, H_a: mean score > 0, as it cannot be smaller than zero. ^c Represents the mean weight assigned to economic independence, which ranges from 0 to 10. Two-sided t-test, with H₀: mean aspiration score = 5, H_a: mean aspiration score ≠ 5. ^d Two-sided p-values of a Spearman's rank correlation, with H₀: both variables are independent.

To test whether these correlations with outspokenness are driven by preferences in one particular direction, we also look at the correlations between perceived competition and the weight assigned to economic aspirations in a pair. The results are presented in the fifth column. We observe that the correlation is statistically significant and positive in the second pair. For more details on the relation between competition, outspokenness, and aspirations per pair, see Figures A.4 and A.5 in Appendix A.

Two questions can be raised about the validity of the aspirations as elicited by our survey. First, the correlation between the level of outspokenness and competition may be the result of students' willingness to express an opinion. Specifically, students who are more willing to express their preference about competition between aspirations are also more willing to express a preference for one of the aspirations. To investigate this, we test whether the level of outspokenness is also correlated with other survey responses that we do not expect to be correlated with aspirations. We correlate individual responses to 10 locus of control statements with the three levels of outspokenness using Spearman's Rho and find only one statistically significant correlation at the 5% level. This demonstrates that the correlation between competition and level of outspokenness is unlikely to be confounded by students' willingness to express an opinion.

Second, one may wonder whether the elicited aspirations have predictive validity, i.e., whether they translate into actual choices. To provide evidence for this, we correlate the weight assigned to economic aspirations with their number of extra-curricular activities as a proxy for their participation in social activities. We find a statistically significant, negative correlation between economic aspirations and the total number of extra-curricular activities in pair 2 (Pearson's $r = -0.106$, $p\text{-value} = 0.012$) and pair 3 (Pearson's $r = -0.109$, $p\text{-value} = 0.011$). Students with stronger economic aspirations tend to be less involved in social activities.

3.3. Aspirations, perceived competition, and social distance

Having variation in social distance among the participants in our sample, along friendship ties and classmates, we can test whether preferences and perceived competition between aspirations are more clustered among friends than among classmates who are not friends, or strangers from a different class. To do so, we calculate the mean absolute distance between ego's aspirations and alter's aspirations for three types of dyads: friends, non-friends from the same class and strangers. For stranger dyads, we randomly selected respondents from a different class in the same district. They could be from the same school or a different school. We follow the same procedure for the perceived competition between the paired aspirations. We expect

the mean absolute distances to be smaller among friends than among non-friends from the same class, and to be smaller among non-friends from the same class than among strangers from a different class.¹⁶

Table 3. Comparison of absolute distance in aspirations and competition, by dyadic relation

Pairwise comparison	(a) Aspirations			(b) Perceived competition		
	Mean	SE	p-value	Mean	SE	p-value
<i>Pair 1: Economic independence – peaceful relations with relatives</i>						
Stranger dyads vs. friends dyads	0.029	0.033	0.379	-0.023	0.023	0.322
Stranger dyads vs. non-friends dyads	-0.005	0.016	0.752	0.032	0.010	0.002
Non-friends dyads vs. friends dyads	0.034	0.035	0.321	-0.055	0.022	0.014
<i>Pair 2: Economic independence – living in proximity of family and friends</i>						
Stranger dyads vs. friends dyads	0.093	0.038	0.013	0.014	0.022	0.530
Stranger dyads vs. non-friends dyads	0.062	0.016	0.000	0.027	0.009	0.002
Non-friends dyads vs. friends dyads	0.031	0.037	0.405	-0.014	0.023	0.556
<i>Pair 3: Economic independence – community engagement</i>						
Stranger dyads vs. friends dyads	0.199	0.036	0.000	0.084	0.021	0.000
Stranger dyads vs. non-friends dyads	0.079	0.019	0.000	0.108	0.010	0.000
Non-friends dyads vs. friends dyads	0.119	0.036	0.001	-0.025	0.021	0.236

Notes. N = 553. For each respondent we calculate the mean absolute difference with three types of alters: friends, non-friends who are in the same class, and strangers. For ‘non-friends dyads’ we use all classmates of ego that are not friends. For ‘friends dyads’ we use all classmates of ego that are friends. For ‘stranger dyads’, we randomly selected 50 students from other classes than ego’s class (but from schools in the same district). Each row compares the average of these indicators between two types of dyads using a two-sample t-test.

Table 3 shows the results. Panel (a) compares the mean absolute distance in aspirations. In the three pairs, we observe that the mean distance between ego’s aspirations and those of their friends is smaller than the mean distance between ego’s aspirations and those of a random set of participants from a different class. This difference is statistically significant in pairs 2 and 3. A similar statistical difference is observed in pairs 2 and 3, when we compare the mean distance among non-friends from the same class with the mean distance among random dyads from a different class. Finally, comparing the mean absolute distance among friends with the mean absolute distance among non-friends from the same class, we only find a statistically significant difference in pair 3.

Panel (b) compares the mean distance in perceived competition. In all three pairs, we find that the mean absolute distance in perceived competition is significantly larger among random

dyads than among non-friends (from the same class), but we do not find a clear pattern when distances are compared between friends and non-friends from the same class.

These results suggest some clustering of preferences between aspirations among friends, but not of perceived competition. As we explain in the next section, this could be driven by several factors, one of them being peer effects. In the rest of this paper, we aim to isolate such peer effects, with the help of regression analysis.

4. Identification strategy

In this section, we elaborate on the regression specification to estimate peer effects, some challenges that might bias the estimates of the effects, and how we plan to address them.

4.1. Regression specification

We estimate the peer effects by making use of a modified version of the linear-in-means model, originally introduced by Manski (1993):

$$Y_i = \alpha + \beta \bar{Y}_{-i} + \gamma X_i + \delta \bar{X}_{-i} + \mu_c + \varepsilon_i, \quad (3)$$

Here, Y_i is the weight individual i gives to the economic aspiration in a pair.¹⁷ Individual characteristics of individual i are represented by vector X_i . The average economic aspiration levels of friends, not including individual i , are labelled \bar{Y}_{-i} . The extent to which individual aspirations are influenced by those of friends is then represented by β , which is the endogenous peers' effect we are interested in.

There is a second more indirect way in which friends can influence ego's aspirations, through so-called "contextual effects". Ego's aspirations can be influenced by the characteristics of his/her friends, as captured by \bar{X}_{-i} , which represents the average characteristics of ego's friends. For example, if ego's friends have a large number of siblings or a high proportion of these friends live with their both parents, this might positively influence ego's social aspirations, as ego feels that the proximity of relatives and good family relations are important pillars of a future life.

We include class-level fixed effects, μ_c , which control for all observable and unobservable characteristics of students who are in the same class. ε_i is the individual-specific error term. We cluster the standard errors to control for non-independencies at the class-level.

4.2. Challenges to identification

There are three important challenges that need addressing when identifying peer effects with the approach described above. First, the linear-in-means model as proposed in equation (3) suffers from the ‘reflection problem’ (Manski, 1993). The reflection problem points to the simultaneity of the mean aspiration levels of a peer group and the aspiration levels of the individuals comprising that group. While friends would influence an individual’s aspirations, this individual would at the same time influence the aspirations of his/her friends. Such simultaneity would overestimate the peer effect, when estimating equation (3).

Second, as an individual cannot be his/her own friend, one needs to remove from the group of friends the individual whose aspirations are influenced by friends. However, doing so leads to a negative mechanical relation between the individual’s aspirations and the average aspirations of his/her friends. Caeyers and Fafchamps (2016) demonstrate that using ordinary least squares as estimator results in a downward bias in the estimation of the peer effect, which they call ‘exclusion bias’.

Third, when estimating peer effects, we need to take account of so-called ‘correlated effects’, caused by network invariant characteristics that influence the aspirations of an individual and his/her friends. Students who are friends might be similar on observable and unobservable characteristics that correlate with aspirations. This would create a spurious correlation among the aspirations of friends (see Manski (1993) on this).

4.3. Characteristics of non-overlapping friends as instruments

To address the challenges raised in the previous section, we follow the approach developed by Bramoullé et al. (2009) and De Giorgi et al. (2010), which exploits partly overlapping networks to identify the endogenous peer effects. Each ego has an individual-specific network of friends and ego’s aspirations are influenced by his/her friends’ aspirations, but also indirectly through the aspirations of his/her friends’ friends. The presence of non-overlapping friends (i.e. the friends of ego’s friends who are not ego’s friends) in ego’s network can be used to identify the effect that the aspirations of ego’s friends exert on ego’s aspirations. More specifically, to identify peer effects, we use the average of a set of exogenous characteristics of non-overlapping friends as instruments for the aspirations of ego’s friends. This approach not only removes potential reflection bias, but also removes exclusion bias as demonstrated by Caeyers and Fafchamps (2016).

This approach also deals with the potential issue of correlated effects, if we can assume that unobservable characteristics (included in the error term) do not correlate between ego and ego's non-overlapping friends. To ensure that this assumption holds, we add class-level fixed effects. If each class consists of one interconnected network, adding class-level fixed effects controls for unobservable characteristics that ego and its non-overlapping friends have in common, and remove any correlation in unobservable characteristics between ego and ego's non-overlapping friends. Based on the network graphs for each of the 11 classes plotted in Figure A.6 in Appendix A, we confirm that each class consists of one interconnected network (i.e., there are not any non-connected subgroups of students).

5. Results

This section presents the regression results. We start with an analysis of the average peer effects of ego's friends on individual preferences in each of the three pairs. Thereafter, we conduct several robustness tests, and look into potential heterogeneity of the peer effects.

5.1. Average peer effects

To estimate equation (3), we use a 2SLS regression and a GMM two-step regression.¹⁸ While we have a large set of potential instruments, we decide to include only a small number of instruments with the highest explanatory power. As instrumental variables, we use the household's *wealth* and *education* levels of the parents of ego's non-overlapping friends. As control variables, we include gender, religion, household wealth, locus of control, number of siblings and a dummy variable equal to one if both parents are still alive. We also add two dummies for TV and internet as sources of exposure to news, a dummy for whether a student has a boy- or girlfriend and a dummy for whether a student engages in sports as extracurricular activity to proxy for additional social interaction with school-going peers. In addition, we control for the parents' employment (farming, business, and salaried work as most important income generating activities of the father and the mother) and education. To control for potential contextual effects, we add ego's friends' averages on the variables that we include as controls. To minimize potential exclusion bias, we also control for the characteristics of ego that we use as instruments.¹⁹

Table 4. Peer effects in aspirations

Dep var = ego's economic aspiration	Pair 1			Pair 2			Pair 3		
	Peaceful relations with relatives			Proximity to family/friends			Community engagement		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mean economic aspiration of ego's friends	0.065 (0.128)	1.398*** (0.541)	1.424*** (0.538)	-0.053 (0.104)	1.419 (0.917)	1.298 (0.887)	0.111 (0.102)	1.572** (0.760)	1.597** (0.760)
	OLS	2SLS	GMM	OLS	2SLS	GMM	OLS	2SLS	GMM
Kleibergen-Paap LM statistic ^a		13.352***			4.891*			8.413**	
Kleibergen-Paap Wald F statistic ^b		10.342			2.428			5.421	
Sargan-Hansen J statistic ^c		0.262			0.272			0.562	
Endogeneity test ^d		7.677***			4.567***			6.408**	

Notes. N = 553. * p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors in parentheses. Class-level fixed effects used. Controls used for the following characteristics of ego and ego's friends: Born again religion, Islam religion, gender, the first component of a household wealth index, total number of siblings, both parents have low levels of education, both parents alive, engages in sports as extracurricular activity, takes care of children / elderly / sick in household, has boy/girlfriend, TV as most important news source, internet as most important news source, Bagisu tribe, the first component of an internal locus of control index, business as most important income generating activity of father and mother, farming as most important income generating activity of father and mother, and salary as most important income generating activity of father and mother. Excluded instruments: 1) the average household wealth index of ego's non-overlapping friends and 2) the proportion of ego's non-overlapping friends who have parents that are both low educated (no education or primary). ^a The Kleibergen-Paap LM statistic tests whether the minimal canonical correlation between the instruments and the aspirations of ego's friends as endogenous regressors is sufficient. The null hypothesis states that the instruments are uncorrelated, which means that the model is under-identified. ^b The Kleibergen-Paap Wald rank F statistic (Kleibergen and Paap 2006) tests the strength of the correlation between the instruments and the endogenous regressor. ^c The Sargan-Hansen J statistic is a test of overidentification. The null hypothesis states that the overidentifying restrictions are valid (Baum, Schaffer, and Stillman, 2010). ^d The endogeneity test compares the OLS estimate with the IV estimate to test whether the regressor is exogenous. The null hypothesis of this test states that the regressor is exogenous.

Table 4 presents the results of the OLS regressions and the second stage of the 2SLS and GMM regressions.²⁰ In pair 1, where the economic aspiration is traded off against the aspiration of having peaceful relations with relatives, the OLS estimate of the peer effect is very small and not statistically significant. In the 2SLS and GMM models, in contrast, the coefficient is 1.398 and 1.424, respectively, and statistically significant. In pair 2, the OLS estimate of the peer effect is again not statistically significant. The 2SLS and GMM estimates generate a substantially higher coefficient of 1.419 and 1.298, respectively, but due to weak instruments, we cannot test whether they are significantly different from zero. We will discuss the validity of the instruments in more detail in the next section. In pair 3, the OLS estimate of 0.111 is also not significant. The 2SLS and GMM estimates identify again substantially stronger peer effects, which are statistically significant at the 5% significance level.

To make any inferences on the basis of the estimates generated by these regression models, we need to examine the validity of the instruments. Table A.5 in Appendix A presents the first-stage results (which are the same for 2SLS and GMM). While the significance of the individual instruments differs across the different models, it should be noted that the instruments should be considered as an entire set, and statistical significance of individual instrument is less relevant if the test diagnostics of the IV estimation are still acceptable.²¹

For 2SLS and GMM the diagnostic tests are the same, so we only report and discuss them once. We start by assessing the *relevance* of the two instruments using the Kleibergen-Paap LM statistic. Under the null hypothesis the instruments are not correlated with the endogenous regressor and the model is not identified. The LM statistic of pair 1 and pair 3 is significant at either the 1% or the 5% significance level, which indicates that these models are identified. However, in pair 2, the LM statistic is statistically significant at the 10% level only, so this model is under-identified. We conclude that the instrumental variable regression models are properly specified to identify a peer effect in the first and third pairs of aspirations.

Next, we report on the Kleibergen-Paap Wald F statistic which uses the strength of the correlation between the instruments and the endogenous regressors. This test is based on the Kleibergen-Paap Wald F statistic and is appropriate when using robust standard errors. We use the Stock and Yogo (2005) critical values as threshold.²² In pair 1, the F statistic of 10.342 corresponds to a relative maximal IV size bias between 15% and 20%, which indicates that the strength of the two instruments is moderate. In pair 2, the correlation between the instruments and the endogenous regressor is very weak, and the F statistic of 2.428 indicates a maximal IV size bias beyond 25%. In pair 3, the F statistic of 5.421 is closer but still below the Stock and Yogo threshold of 7.25, which indicates that the maximal IV size bias is again above 25%.²³

In addition, we test whether the overidentifying restrictions are valid, using the Sargan-Hansen J test. This is crucial as our identification strategy relies on the exclusion restriction that non-overlapping friends are exogenous, i.e., are not correlated with the error term. The Sargan-Hansen J statistic in each of the three models has a p-value of more than 10%, which means that the overidentifying restrictions are valid and that the excluded instruments are correctly left out of the reduced form of the model. A final diagnostic test compares the OLS estimate with the IV estimate, to test whether the regressor is exogenous. If the null hypothesis of exogeneity is not rejected, we should use the OLS estimate as it is more efficient.²⁴ As the test statistic is statistically significant for all three models, we use the 2SLS and GMM estimates.

To summarize, when we compare the estimates of the three estimation methods, we observe that the effects estimated with 2SLS and GMM are stronger than the effects estimated with OLS. This suggests that the (negative) exclusion bias in the OLS estimates is stronger than the positive bias created by correlated effects and reflection bias. We also found that, apart from the pair 2, our model is properly specified and the instruments correlate sufficiently with the endogenous regressors, which we rightfully treat as endogenous. Moreover, the estimated peer effect in pair 1 is most precise, while the estimate in pair 3 may be less accurate. In pair 2, we are unable to test for peer effects due to weak instruments. However, as the 2SLS and GMM estimates are qualitatively similar in size to the estimates for pair 1 and pair 3, we expect that we would have identified peer effects if we had sufficiently strong instruments. Altogether, the 2SLS and GMM estimates of the coefficients of the average preferences of ego's friends are statistically significant in pairs 1 and 3, which confirms that there are important peer effects in the extent to which adolescents prioritize economic aspirations in these pairs.

5.2. Robustness tests

In this section, we conduct several robustness tests that deal with concerns related to 1) the perceived competition between paired aspirations, and 2) the friendship ties we use to estimate peer effects.

5.2.1 Perceived competition

So far, we have not used the perceived competition between paired aspirations when estimating the peer effects on the extent to which adolescents prioritize economic aspirations. In the descriptive analysis in Section 3.2, however, we found important variation in perceived competition, which can affect the estimation of the peer effects in aspirations if peer effects in

aspirations work partially via peer effects in perceived competition, and/or if the elicited preferences between paired aspirations are less accurate with lower perceived competition.

First, the degree to which respondents perceive aspirations in a pair as competing potentially correlates with the weights assigned to the aspirations. We found evidence for this in Table 2, which showed a statistically significant positive correlation in pair 2. This correlation can bias the estimated peer effects in aspirations if there are peer effects in perceived competition. It is plausible that when students discuss the different aspirations, they also share their views on the challenges to achieve them, including the potential competition among them. To test whether the peer effects on the extent to which adolescents prioritize economic aspirations are confounded by perceived competition levels, we add ego's and ego's friends' perceived competition as controls in the regressions. The results are presented in Table A.7 in Appendix A. We observe that all the estimates are robust.¹

Second, some participants in our study might not perceive the paired aspirations as competing and might consider them as independent or even complementary. As argued by some respondents of the open-ended interviews we conducted in the preparatory stage, economic autonomy could help support friends and relatives, and make contributions to the wider community. If a respondent considers that aspirations in a pair are independent or complementary, assigning weights to them is less meaningful. In other words, low levels of perceived competition could affect the accuracy of the elicited aspirations, and with it the inference on potential peer effects. To address this issue, we use the perceived competition variable as sampling weights in the IV regressions. This approach gives more importance to the aspiration scores of respondents who consider the paired aspirations more competing. The results, presented in Table A.9 in Appendix A, show that the use of the competition levels as sampling weights increases the coefficient of the peer effects in pairs 2 and 3, but decreases it in pair 1. In additional analysis, we test whether the peer effects interact with ego's perceived competition or with the perceived competition of ego's friends. Tables A.10 and A.11 in Appendix A present the results, and do not identify any such interaction effects.

¹ Following the same regression approach to identify peer effects in perceived competition, we do not find any support for such peer effects (see the results presented in Table A.8). This is also in line with the lack of any clustering in perceived competition, when we compared the mean distance in perceived competition between friends and non-friends (Panel (b) of Table 4).

5.2.2 Friendship ties

A second concern relates to the friendship ties we use to estimate peer effects. The identification of peer effects might be complicated if the number of friends one has confounds one's social aspirations. It could also be influenced by the definition of friendship ties, and whether we include friends from other classes in the same school. We look at each of these issues in turn.

First, while all students in our sample have at least one friend, we have substantial variation in the number of friends. This variation might confound the relative weight they assign to social aspirations. For example, students with fewer friends might give a lower weight to social aspirations because for them it is more difficult to imagine having good social relations. To test whether this confounds the estimated peer effects, we add the number of ego's friends and the mean of ego's friends' friends in the classroom as controls. The results are presented in Table A.12 in Appendix A. We find that adding these control variables does not affect the size and significance of the estimates of the peer effects. The test diagnostics also remain similar and even improve, suggesting that controlling for the number of friends of ego and ego's friends improves identification.²

Second, there are several ways to define friendship ties, and so far, we used friends *as reported by ego*. As we are interested in how ego's aspirations are influenced by the aspirations of friends, whoever ego thinks are his/her friends should be the most relevant peers. One can also *symmetrize* friendship ties, by also using the reports provided by alter. We expect such ties to be less relevant for peer effects. This is confirmed by the additional analyses reported in Appendix B where we do not find any peer effects with symmetrized friendship ties.

Third, it could be argued that friends from other classes in the same school could also be important peers. Not including extra-class friendship ties could affect the estimates of peer effects (on this see, e.g., Advani and Malde (2018)). It might have an influence on both the average aspirations of peers and the instrumental variable, as the set of peers and non-overlapping peers might increase if we include extra-class friends. However, if the number of friends outside the class is relatively small compared to the number of friends in the class, we can argue that the potential bias caused by the exclusion of extra-class friends will be limited.

² Interestingly, while ego's number of friends has no influence on individual preferences in the three pairs, the mean number of ego's friends' friends has a positive effect on the economic aspirations in Models 1 and 3. A possible explanation for this result is the increased access to future economic opportunities through the networks of ego's friends, which would make economic aspirations more attractive.

To provide support for this, we elicited the number of extra-class friends. On average, students report having five extra-class friends at their school, which is statistically significantly lower than the average of 11 friends they have in their class (average difference = 6.01, two-sided p-value of a paired t-test = 0.000). This confirms that friends in the class are more prevalent than extra-class friends, and that the potential bias caused by the exclusion of extra-class friendship ties will be limited.

5.3. Heterogeneity in peer effects

So far, we estimated average peer effects, but we did not touch on potential heterogeneity in peer effects across different types of adolescents. Identifying heterogeneity in the peer effects allows us to shed light on the possible mechanisms behind the identified peer effects. To guide the heterogeneity analysis, we use the function $\lambda_i = f(c, i, r, p)$ which we introduced in the theoretical model. This function links parameter λ_i , which captures the strength of the peer effects, to the amount of information transmitted (i), the relevance of that information (r), and the importance of other sources of information (p). To look into the role of these mechanisms we explore heterogeneity in the peer effects, using a limited set of characteristics of ego. We expect that these characteristics affect (access to) the amount of information available, the relevance of the information, and its importance.

First, we expect that the peer effect increases with the degree of interaction among peers, as it influences the likelihood that information about aspirations is shared. To test this, we look at extracurricular activities. Students who engage in such activities are expected to have more intense social interaction with their peers. This is supported by the observation that students who engage in sports as extracurricular activity have more friends who engage in sports than students who do not engage in these activities (average difference in proportion of friends who engage in sports activities = 0.077, two-sided p of a t-test = 0.001). We can therefore hypothesize that peer effects are stronger among students who participate in sports as extracurricular activity. To test this, we use a binary variable equal to one for students who participate in sports as extracurricular activity (with 67% this is the most popular extracurricular activity) and interact this with the mean aspiration score of ego's friends. To estimate this interaction effect, we only use the first pair of aspirations, where the identification was strongest. The results are presented in the first column of Table 5. The statistically significant and positive coefficient of the interaction term confirms that students who engage

in sports as extracurricular activity are more likely to be influenced by the aspirations of their friends.

Table 5. Heterogeneous peer effects

	(1)	(2)	(3)
Mean aspiration score of ego's friends	0.483 (0.493)	0.464 (0.594)	2.507*** (0.885)
Sports	-8.284** (3.568)		
Mean aspiration score of ego's friends * Sports	1.499** (0.674)		
Bagisu		-8.359** (4.216)	
Mean aspiration score of ego's friends * Bagisu		1.554** (0.787)	
Number of siblings			1.058** (0.473)
Mean aspiration score of ego's friends * Number of siblings			-0.203** (0.088)
Kleibergen-Paap LM statistic ^a	21.279***	19.529***	14.598***
Kleibergen-Paap Wald F statistic ^b	8.242	6.165	4.948
Sargan-Hansen J statistic ^c	2.929	0.608	0.127
Endogeneity test ^d	9.199**	9.226**	7.259**

Notes. N = 553. Dep var = weight given to economic aspiration vs. peaceful relations with relatives. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. GMM two-step estimation used. Robust standard errors in parentheses. Class-level fixed effects used. The same set of controls is used as the regressions reported in Table 5. Instruments: 1) average household wealth of ego's non-overlapping friends, 2) the proportion of ego's non-overlapping friends whose parents have low levels of education, 3) the interactions between 1) and 2) and the heterogeneity variable of interest. ^a The Kleibergen-Paap LM statistic tests whether the minimal canonical correlation between the instruments and the aspirations of ego's friends as endogenous regressors is sufficient. The null hypothesis states that the instruments are uncorrelated, which means that the model is under-identified. ^b The Kleibergen-Paap Wald rank F statistic (Kleibergen and Paap, 2006) tests the strength of the correlation between the instruments and the endogenous regressor. ^c The Sargan-Hansen J statistic is a test of overidentification. The null hypothesis states that the overidentifying restrictions are valid (Baum, et al. 2010). ^d The endogeneity test compares the OLS estimate with the IV estimate to test whether the regressor is exogenous. The null hypothesis of this test states that the regressor is exogenous.

Second, we test whether peer effects are stronger among students who belong to the Bagisu tribe, which is the largest tribe in the study area. 70% of the students in the sample belong to this tribe, with the other 30% spread among a large variety of other tribes (Bagwere, Teso, Sebei, Karamajong, Basoga, etc.). Students who are Bagisu have more friends who are Bagisu. The proportion of friends who are Bagisu is higher for Bagisu students than for students from another tribe (average difference = 0.166, two-sided p of a t -test = 0.000). As Bagisu students

share the same social reality, being part of the dominant Bagisu tribe increases the relevance of the information received on the trade-offs between aspirations as experienced in the study area. As a result, we expect peer effects to be stronger among Bagisu students. This hypothesis is supported by the positive coefficient of the interaction term presented in the second column.

Third, the strength of the peer effects can also depend on household composition. We see two channels that could be at play, both going in the same direction. The information received from peers and information received from siblings at home compete for the students' attention. Such competition would weaken the influence of the information received from friends at school. In addition, adolescent children from large families are more likely to support the household and consequently, are less sensitive to their peers' influence. To test whether the strength of the peer effects depends on the total number of siblings, we add an interaction term in the regressions. The results are presented in the third column. The negative and statistically significant coefficient of the interaction term confirms that the peer effects are weaker among adolescents who have more siblings.

6. Discussion and conclusion

At some point during adolescence people need to decide which aspirations to prioritize, and this decision may be influenced by their friends. In sub-Saharan Africa, adolescents face an important trade-off between economic aspirations and the aspiration to comply with traditional social obligations. To identify potential peer effects on the extent to which adolescents prioritize economic aspirations in such a setting, we elicited the preferences and perceived competition between economic aspirations and three aspirations in the social domain of 553 high school students in Uganda, as well as the friendship ties among all classmates.

We found that students perceived the paired aspirations as competing, which supports a key assumption underlying adolescents' choice structure in our study. Most of them also had a clear preference for one of the aspirations in each pair. On average, they had a slight preference for economic aspirations when paired with the aspiration of living in proximity of friends/relatives, or the aspiration to engage with the local community, but not when paired with the aspiration of having peaceful relation with relatives.

We identified a strong positive peer effect in two of the three pairs of aspirations. Specifically, adolescents are more likely to prioritize economic aspirations over the aspiration of having peaceful aspirations with relatives, the more their friends do so as well. Similarly, they are more likely to prioritize economic aspirations over community engagement, the more

their friends prioritize economic aspirations in such a setting. We only identified these peer effects, when using instrumental variables. This suggests that the (negative) exclusion bias in the OLS estimates is stronger than the positive bias created by correlated effects or potential reflection bias. We were unable to identify a peer effect on the extent to which adolescents prioritize economic aspirations over the aspiration to live in proximity with friends/relatives due to a problem of weak instrumental variables.

The identification of peer effects on the extent to which adolescents prioritize economic aspirations can be complicated by variation in perceived competition between aspirations. First, the peer effects in the extent to which adolescents prioritize economic aspirations could be confounded by perceived competition levels if peers also exert an influence on perceived competition. However, we did not identify any peer effects on perceived competition. Importantly, the estimates of the peer effects are robust to the use of controls for ego's and ego's friends perceived competition. Second, low levels of perceived competition might affect the accuracy of the elicited aspirations, and with it the inference on potential peer effects. We found that the use of ego's competition levels as sampling weights increases the estimated peer effects in pairs 2 and 3 but decreases it in pair 1. In an additional analysis, we interacted the peer effects with ego's perceived competition and the perceived competition of ego's friends, but we did not find any significant interaction effects. We conclude that the perceived competition between aspirations does not affect the identification of peer effects.

Further analyses identified interesting heterogeneity in the peer effects. We found that the peer effects are stronger among students with extra-curricular activities, which we interpret as evidence in support of the importance of the frequency of social interaction, hence the amount of information shared. In addition, peer effects are stronger among students of the largest tribe, and weaker among students with more siblings. The latter two results suggest that peer effects are stronger when the information shared is more relevant or more important relative to other signals.

A final note is required on the external validity of the identified peer effects. We focused on the most senior students in the Ugandan high school system. Compared to adolescents not enrolled in school, these students (and their parents) presumably already have relatively high economic aspirations. It is also plausible that constraints imposed by traditional social norms and prescribed social roles might be less severe for them. If the latter is true, we expect peer effects to be weaker among school-going adolescents, such that our results can be interpreted as a conservative estimate for the wider adolescent population in the area.

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Endnotes

¹ For an interesting exception, see D'Exelle and Verschoor (2015) who found in an investment game implemented in a field lab that economic investment is higher when investment profits can be shared with friends.

² 'Non-overlapping' friends are friends of ego's friends who are not friends of ego. With 'ego' we refer to the respondent whose preferences are influenced by the preferences of his/her friends, called 'alters'.

³ This literature suggests there is a strong link between poverty and aspirations. It assumes that the ability of people to invest effectively in their future, which is essential to escape poverty, draws heavily on their 'capacity to aspire' (Appadurai 2004).

⁴ In an older version, Bernard et al. (2014) also reported on how they tried to identify potential peer effects by exploiting the variation in the number of respondents in a village that were treated. They found that the treatment effects on aspirations partly depend on the number of peers exposed to treatment.

⁵ Mora and Oreopoulos (2011) looked at peer effects among friends in the classroom on educational aspirations but they did not go beyond educational aspirations and did not address potential endogeneity biases.

⁶ See e.g. Boucher et al. (2014), Liu, Patacchini, and Zenou (2014), and Patacchini and Zenou (2012). Patacchini and Zenou (2012, p. 2) define conformism as "the idea that the easiest and hence best life is attained by doing one's very best to blend in with one's surroundings and to do nothing eccentric or out of the ordinary in any way".

⁷ Note that this friendship does not need to be reciprocated. In other words, we remain silent about whether individual j agrees that they are a friend of i .

⁸ As classes in Sironko were substantially smaller than in Mbale, our sample would be dominated by Mbale based students if we sampled an equal number of classes in both districts. To avoid this, we randomly sampled one additional class in Sironko.

⁹ The official lists of registered students contained 674 students. However, we soon realized that a considerable number of students were not attending school (anymore). These students were removed. We are confident that all students who were actively attending school at the time of the fieldwork participated in our study.

¹⁰ Before these interviews, we also organized seven focus group discussions (FGDs) in May 2015 in the Greater Mbale area in Uganda. Participants in the FGDs were asked whether and how friends could have an influence on individual aspirations. Friends were reported to be a significant source of knowledge and inspiration when forming aspirations.

¹¹ We paired aspirations with six alternative aspirations to economic independence. For this paper, we only selected the three alternatives in the social domain that share a communal component. The three remaining aspirations paired with the aspiration to become economically independent which are not included in this paper are: the aspiration to get children, the aspiration to get married and the aspiration to obtain a higher education degree. The selection of aspirations that are comparable allows for the use of a uniform set of instruments. Using the same instruments to estimate peer effects in the other three pairs of aspirations results in three unidentified models.

¹² Even though respondents were able to answer that paired aspirations did not compete, just asking this question might have primed them to think that they compete. As a result, responses potentially give an upper bound.

¹³ We also elicited 'aversive' ties to investigate whether they create negative peer effects. We asked respondents to indicate with whom they did not get along with in their class. We do not use these data, as the frequencies are very low.

¹⁴ We identified some statistically significant differences between the removed students and the final sample (see Table A.3 in Appendix A). However, given the small number of students that were removed and the lack of any statistically significant correlation between the aspiration scores and the number of friends or the proportion of classmates that are friends, we expect that the impact of the removal of these students on the estimates of the peer effects will be limited.

¹⁵ Table A.1 in Appendix A presents correlations between ego's characteristics and the mean characteristics of ego's friends. Apart from the income generating activities of the parents and the use of TV as most important source of news, all correlation coefficients are statistically significant, suggesting a high degree of network homophily.

¹⁶ Table A.2 in Appendix A provides more details on the mean aspirations of ego's friends for each of the three pairs.

¹⁷ We assume that with 11 response categories the dependent variable is sufficiently continuous to justify the use of standard OLS estimation techniques.

¹⁸ The GMM two-step method is a generalized methods of moments estimation method that can be used when the assumption of independent and identically distributed errors does not hold. Compared to the 2SLS method, the GMM two-step method is better suited to make standard errors and test statistics robust to heteroscedasticity (Wooldridge 2001).

¹⁹ For technical details see Caeyers & Fafchamps (2016).

²⁰ Table A.4 in Appendix A presents the full OLS regression results.

²¹ The negative direction of the coefficients of the instrumental variables might seem counterintuitive. As explained by De Giorgi et al. (2010, p. 261-262) the cause of this negative relationship has its origin in the fact that excluded peers are a random subsample of the total group of potential peers (i.e., all classmates except ego). Consequently, a deviation of the mean characteristics of ego's peers from the class average is compensated by an opposite deviation in characteristics of the group of remaining classmates who are not ego's peers, which also included ego's excluded peers. As a result, the mean characteristics of ego's peers and ego's excluded peers are mechanically negatively correlated.

²² As the threshold between strong and weak instruments depends on the type of violation of the i.i.d. assumption, which differs across studies (Bazzi & Clemens, 2013), critical values for the Kleibergen-Paap Wald rank F statistic have not yet been established. Therefore, we apply the critical values normally used for the Cragg-Donald Wald F statistic and use the Stock and Yogo (2005) critical values to interpret the size of the Kleibergen-Paap F statistic (Baum, Schaffer, and Stillman 2007).

²³ As critical values for the Kleibergen-Paap Wald rank F statistic have not been established yet, we also run a number of weak-instrument-robust tests to assess the accuracy of the peer effects estimated with GMM. The results are presented in Table A.6 in Appendix A and show that we should reject the null hypothesis that the two instruments are irrelevant in all pairs of aspirations, except for the second pair (see the conditional likelihood ratio (CLR) test and Lagrange multiplier K statistic).

²⁴ A robust Durbin-Wu-Hausman is used, of which the null hypothesis states that the endogenous regressor can be treated as exogenous. Therefore, if the test is significant and we reject the null, we should use the estimates from the 2SLS and GMM regressions. If the test is not significant and we cannot reject the null, we should use the estimates from the more efficient OLS regression.