# On the endogeneity of parental expectations and children's academic attainment

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Abstract: Parents and their children's expectations on educational achievement have been highlighted in the literature as proper proxy indicators for students' forthcoming performance. In this research we intend to measure the effect of these indicators accounting for the existence of endogeneity –due to their reciprocal relationship–. Our results show a positive influence of the agreement of parental and children's expectations on students' achievement and on the likelihood of children's enrollment in a particular academic track. However the effect varies according to whether the one reporting higher expectations is the father/mother or the child. In addition, parental expectations have been found to be dependent on family socio-economic background, what supports the persistence of strong barriers to socioeconomic mobility of children. We suggest policy interventions as, e.g., fostering the participation of both parents and children on university and professional orientation in early stages of secondary education, so they could have complete and symmetric information to set their expectations on a realistic basis.

Keywords: parental expectations; children's expectations; indicators; educational performance; endogeneity.

## 1. INTRODUCTION

Only recently, educational expectations of parents and children have been highlighted in the literature as important factors in predicting students' academic achievement. These expectations are said to maintain a reciprocal relationship between them –generating problems of endogeneity in the estimates– (Hao and Bonstead-Bruns 1998; Zhang et al. 2011). This complicates empirical analyses and, consequently, the literature on this has been scarce. This is particularly the case of Spain, where there is the additional difficulty of getting access to good observational data on expectations.

In this context, we intend to measure whether the coincidence or discordance of parental and children's expectations could condition the achievement of the latter, controlling for a set of factors traditionally considered to play a significant role in the education production functions (e.g., gender, family background, effort, etc.). Furthermore, this agreement (or disagreement) in expectations could be affecting the high school track followed by students after completing compulsory education (Räty 2006) and, consequently, the academic career of children. The main interest of going in depth into these issues is to determine the extent to which their potential positive relationship could help to overcome the limiting effect of low socio-economic characteristics of the household on students' educational attainment. In so far as the coincidence of parental and children's expectations may increase students' achievement and this agreement could be achieved by specific policy interventions, we could be moving towards a more meritocratic society, what represents an important aim for education policy interventions (Marcenaro et al. 2015). Besides, we believe that this agreement (or disagreement) is caused by the asymmetric information of parents and children with regard to the actual capacity of the latter, what has important implications in terms of educational policies, as the personal and pecuniary cost of those failing to complete their academic track is massive –sometimes due to inappropriate selections by children following their parents' advices–, what is a matter of particular concern in times of budgetary constraints.

The rest of the paper is organized as follows: In section 2 we make a brief revision of the literature on parental and children's educational expectations. In section 3 we describe the data. Section 4 is devoted to the methodology employed to obtain the results reported in section 5. Finally, section 6 presents the main conclusions and comments on the policy implications derived from our analysis.

## 2. BACKGROUND AND LITERATURE REVIEW

The use of expectations as a relevant variable in explaining students' achievement began with the seminal works of Sewell and Vimal (1968) and Sewell et al. (1970), who considered expectations in their achievement models and obtained that they were proper predictors of students' achievement.

A key issue within the literature on expectations is that socio-economic background has been highlighted as helping to increase children's and parental expectations and then academic

achievement. This is a subject of particular concern in our research, since we intend to check whether this relationship is accomplished in the case of Andalusia and, if so, how to mitigate it, in order to boost meritocracy. Hao and Bonstead-Bruns (1998) argued that high income level in the household supposed higher parental expectations, which were translated into the allocation of the income in educational activities and participation in school programs. In addition, they claimed that agreement on parental and students' expectations helped students –of eighth grade in United States– to obtain better achievement. Similarly, Rimkute et al. (2012) found that family background, previous academic achievement and parental level of education predicted parental and students' expectations. What it is more, they highlighted that parental expectations were good indicators of children's expectations and that parental and children's expectations became more similar when students reached ninth grade, so their expectations converge when adolescents approach an education transition, due to the higher discussion about this subject with their parents (Nurmi 2004), therefore expectations become more realistic.

There are many facts which can be reflecting parental expectations, as parental involvement, which has been frequently remarked as helping to increase academic achievement in school (see, e.g., Hanson et al. 1997). Froiland et al. (2012) measured the influence of parental involvement on children's achievement by activities like helping them with homework and obtained that it was positive for kindergarten students, but when reaching to eighth grade these practices could be counter-productive. Nonetheless, Hao and Bonstead-Bruns (1998) stated the relevance of parental involvement in school learning, because it favors the increase in eighth grade students' expectations. Furthermore, Wang and Benner (2014) found that, to the extent that parental expectations are higher than students', children will be benefited by the higher support and engagement of their parents. Froiland and Davison (2014) analyzed parent-school relationship and parental expectations in the determination of schools' outcomes in the United States' secondary and high schools, finding that these factors were very relevant. They also showed that parental expectations had a positive and higher relation with school outcomes than socio-economic background characteristics of the families, what highlights their relevance.

Expectations have also been analyzed in the Spanish context, although to lesser extent; e.g. Torío et al. (2007) found that students from the region of Asturias had higher expectations in their academic future when their achievement and the level of parental education were high. Portes et al. (2010) highlighted that the determinants of expectations and aspirations in Spain were similar to that of students from the United States (demographic factors, socio-economic background, language skills, etc.) and that they could provide an increase in the achievement of second generation immigrants, what would promote social mobility.

Hence, building on the previous literature, the procedure we follow in order to get an accurate vision of the influence of parental and children's expectations agreement/disagreement on students' achievement and their elected high school track –after finishing compulsory education– consists of a two steps procedure. In the first step, we intend to predict "endogeneity-free" parental and students' expectations –due to their reciprocal relationship– by using Two Stage Least Squares estimation methodology; this is based on the idea that we

could avoid the endogenous effect of students' expectations on parental expectations by replacing parental expectations with an instrumental variable and same applies to the endogenous impact of parental expectations on students expectations. The predicted instrumented values of students' expectations and parental expectations –once we have removed endogeneity problems– could be employed in the second step to estimate whether their coincidence (or discordance) affects children's achievement/education elections after the last course of secondary education.

To conclude, as it can be appreciated from the literature review, there is a virtual absence –to the best of our knowledge– of previous literature for the Spanish case on parental and children's expectations coincidences and discrepancies –dealing with their potential endogeneity– as proxies for ulterior students' achievement and the election of the post-secondary academic track by the student, so we intend to provide empirical evidence on this subject.

## 3. DATA

When performing our analysis we make use of the recent survey ESOC10 (Social Survey 2010: Education and Housing) focused on Andalusia and conducted among a total of 5,032 students aged 10-11 and 14-15 and their families –2,584 from the subsample of students born in 1994 and 2,448 from those born in 1998–. This survey was linked to the results from the Andalusian diagnostic assessment tests and to the administrative records (SENECA) of teacher-based scores, provided by the *Andalusian Regional Government*. This combined database (hereafter ESOC10-SEN) is further reduced by removing those students who: presented some kind of disability, attended to a private school, have repeated a course[157] or about whom the database does not have information on these aspects. These filters left us with a subsample of 1,376 observations for students born in 1994 and 2,027 for those born in 1998.

We focus the analysis on the subsample of students aged 14-15, because at this age their achievement scores are measured in a 0 to 10 integer scale, while at age 10-11 they present a lower number of categories[158], what reduces the discrimination power of the model; additionally, we do not have information on future high school tracks for 10-11 years old students. Hence, once focusing in the subsample of 1994, it was also reduced due to the removal of guardians who answered parents' questionnaire and those parents who did not provide information on their expectations –which is an essential variable in our analysis–, what leaves us with a subsample of 1,295 individuals.

The use of the instrumental variable "the person of reference works more than eight hours every day" reduces the subsample to 1,092 observations. We employed a missing flag

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[157] We have not included repeaters in our analysis due to the specific characteristics that these students present –like a high likelihood of grade retention and dropping out, as highlighted by many authors, e.g. Carabaña (2013), and thus their lower achievement (Cordero et al. 2013)– what could potentially bias the results of our research. In addition, to the extent that repeater students were also born in 1994 and 1998 –respectively–, they will be attending at least one course under that of non-repeater students, so repeaters' achievement in reading and mathematics woould not be comparable to that of non-repeaters.

[158] These categories are: fail –2.5–, pass –5–, good –6–, very good –7.5– and excellent –9–.

procedure in our estimates to control for the potential bias introduced by removing those parents who did not provide information on the household income level[159].

The timing of the observations is also a relevant issue in the kind of study we are performing. For reading and mathematics scores and high school tracks, they are dated to the end of the 2009/10 course, i.e., the last days of June 2010. The rest of variables –among which we find parental and students' expectations– were collected in the ESOC10 survey from April to June 2010.

## 4. METHODOLOGY

Once described the data and the two steps model employed in this analysis, the empirical implementation of these steps is explained in what follows.

### 4.1. First step of the analysis

Formally, the procedure we follow consists of two clearly differenced steps, which first step models are defined by the estimation of equations (1) and (2) as:

$$\mathbf{SE} = \mathbf{PE}\beta_1 + \mathbf{PC}\beta_2 + \mathbf{PI}\beta_3 + \mathbf{SC}\beta_4 + \mathbf{SCHC}\beta_5 + \varepsilon_1 \tag{1}$$

$$\mathbf{PE} = \mathbf{SE}\gamma_1 + \mathbf{PC}\gamma_2 + \mathbf{PI}\gamma_3 + \mathbf{SC}\gamma_4 + \mathbf{SCHC}\gamma_5 + \varepsilon_2 \tag{2}$$

where $\mathbf{PE}$ represents parental expectations and $\mathbf{SE}$ represents students' expectations[160]; $\mathbf{PC}$ stands for parental and household characteristics and $\mathbf{PI}$ for parental interaction in education; $\mathbf{SC}$ represents students' characteristics; $\mathbf{SCHC}$ stands for school characteristics; being $\beta_i$ –with $i$=1,…5– (in equation 1) and $\gamma_j$ –with $j$=1,…5– (in equation 2) their respective slopes. Finally, $\varepsilon_1$ and $\varepsilon_2$ are the vectors of error terms which are hypothesized as $\varepsilon_1 \sim N(0, \sigma_{\varepsilon_1}^2)$ and $\varepsilon_2 \sim N(0, \sigma_{\varepsilon_2}^2)$.

The variables $\mathbf{SE}$ and $\mathbf{PE}$ are the dependent ones in equations (1) and (2), respectively. Nevertheless, when we include each one as regressor for the other, an endogeneity problem arises, because they are jointly determined by students and parents, what violates an important assumption of the model: the independence between regressors and the error term. Because of that, we make use of an instrumental variables approach by estimating equation (1) and (2) by Two-Stage Least Squares (2SLS), proposing $\mathbf{Z_1}$ (for equation 1) and $\mathbf{Z_2}$ (for equation 2) as instruments. These instrumental variables must fulfill the relevance requirement (they must account for a significant variation in the endogenous variable) and the validity requirement (they must not be correlated with the error term, i.e., $\mathrm{E}(\varepsilon_1|\mathbf{Z_1}) = 0$ and $\mathrm{E}(\varepsilon_2|\mathbf{Z_2}) = 0$).

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[159] For the estimations reported in Table 3, the use of students' scores in reading/mathematics, the variable for the high school track chosen by the students in the course 2010/11 and the variable that indicates coincidences/discordances between students' and parental expectations contribute to slightly reduce the subsample.

[160] Both parental and students' expectations are coded according to the translation of the ISCED level of studies that students or parents expect –for students' highest level of education– to the correspondent number of years of education: not finishing secondary studies (6 years), secondary studies (10 years), middle-level vocational training or high school (12 years), high-level vocational training (14 years) and university studies (16 years).

Following these requirements and the related literature, we have checked which variables inside our dataset could potentially be adequate instrument candidates. However, as it is well known from the Econometric literature, finding a proper instrumental variable is always a difficult task. In our case, the proposed instrumental variables have never been employed in the study of expectations, but they have provided good results in this research –to the best of our knowledge–, both empirically –as can be seen in Table 2, section 5– and theoretically, as it is discussed in what follows.

Particularly, the instrumental variable selected for parental expectations ($Z_1$) was "parental opinion on student's manual skills" –ranging from 0 to 10–, which could be reflecting that parents are usually those who realize the potential abilities that their children could have and develop –in addition to teachers– (Winner and Martino 1993), formulating their expectations based on their perceived skills. These "manual skills" are presented by children in a natural way and they could also affect competences in many fields of human activity as art, music, etc. (Howe et al. 1998), due to the wide range of disciplines that this term gathers. This variable could be reflecting parents' perception of children's innate talent –students who are very brilliant in many aspects or gifted–, although they could not be employing their abilities on the education field, presenting underachievement in some cases, which could be due to many aspects as high and unrealistic parental expectations about their performance (Steven 2002).

In the case of students' expectations, the selected instrumental variable ($Z_2$) indicates whether the person of reference –the person who provides higher income to the household– works more than eight hours every day or not. Vincent and Neis (2011) stated that parental work schedules have recently changed, reaching to a configuration where both parents work full-time and even in non-standard working hours. In addition, they established that parental work schedules can influence parents' emotional state, affecting their relation and involvement with their children, what finally influences students' achievement. In relation to children's perception of their parents' job, Wierda-Boer and Rönkä (2004) obtained that students wished that their parents could have a job which involved less working hours, better paid, with more holidays and less travelling. Thus, students would be seeking more attention from their parents. Furthermore, Kinnunen and Mauno (2001) highlighted that students are more critical with their parents' job than themselves.

Returning to our empirical model, we have redefined equation (1) by including the instrumented value of **PE** and equation (2) by adding the instrumented value of **SE**, both from the first stage of their respective 2SLS estimations. Then, we obtain the following equations:

$$\mathbf{SE} = \widehat{\mathbf{PE}}\beta_1 + \mathbf{PC}\beta_2 + \mathbf{PI}\beta_3 + \mathbf{SC}\beta_4 + \mathbf{SCHC}\beta_5 + \varepsilon_1 \tag{3}$$

$$\mathbf{PE} = \widehat{\mathbf{SE}}\gamma_1 + \mathbf{PC}\gamma_2 + \mathbf{PI}\gamma_3 + \mathbf{SC}\gamma_4 + \mathbf{SCHC}\gamma_5 + \varepsilon_2 \tag{4}$$

The first stage of 2SLS begins with the estimation of equations (3.a) and (4.a), respectively: The first one (equation 3.a) includes as regressors the correspondent instrument ($Z_1$) and **PC**, **PI**, **SC**, **SCHC**, while the second one (equation 4.a) includes **PC**, **PI**, **SC**, **SCHC** and the instrument ($Z_2$). The dependent variable in equation (3.a) will be the endogenous one in (3) and the dependent variable of equation (4.a) will be endogenous of (4), respectively, so we obtain the following models to estimate:

$$\widehat{\mathbf{PE}} = \mathbf{Z_1}\pi_1 + \mathbf{PC}\pi_2 + \mathbf{PI}\pi_3 + \mathbf{SC}\pi_4 + \mathbf{SCHC}\pi_5 \qquad (3.a)$$

$$\widehat{\mathbf{SE}} = \mathbf{Z_2}\theta_1 + \mathbf{PC}\theta_2 + \mathbf{PI}\theta_3 + \mathbf{SC}\theta_4 + \mathbf{SCHC}\theta_5 \qquad (4.a)$$

Then, in the second stage of 2SLS we add the fitted values of parental expectations ($\widehat{\mathbf{PE}}$) from equation (3.a) and the fitted values of students' expectations ($\widehat{\mathbf{SE}}$) from equation (4.a) in their respective original regressions ($\widehat{\mathbf{PE}}$ in the case of equation 3 and $\widehat{\mathbf{SE}}$ in equation 4). Due to their properties $-Cov(\widehat{\mathbf{PE}}, \varepsilon_1) = 0$ and $Cov(\widehat{\mathbf{SE}}, \varepsilon_2) = 0-$ endogeneity should not be a problem. Thus, we will estimate (3) and (4) in the second stage of 2SLS.

### 4.2. Second step of the analysis

Once obtained a prediction of students' expectations ($\widehat{\mathbf{SE}}$) and parental expectations ($\widehat{\mathbf{PE}}$) from equations (3) and (4) –which are no longer joined to the random error term– they will be employed in the second step of our analysis, represented by the estimation of the model:

$$\mathbf{SA} = \widehat{\mathbf{PSE}}\delta_1 + \mathbf{PC}\delta_2 + \mathbf{SC}\delta_3 + \mathbf{SCHC}\delta_4 + \mathbf{SEF}\delta_5 + \tau \qquad (5)$$

where $\mathbf{SA}$ measures students' achievement in reading or mathematics and $\widehat{\mathbf{PSE}}$ represents whether predicted parental expectations are higher, similar or lower than predicted students' expectations, being its coefficient $\delta_1$. This variable is defined by the use of the predicted students' expectations ($\widehat{\mathbf{SE}}$) from equation (3) and the predicted parental expectations ($\widehat{\mathbf{PE}}$) from equation (4)[161]; $\mathbf{SEF}$ represents students' effort and $\delta_5$ is the vector of its slopes; $\tau$ is the vector of error terms which is hypothesized to be normally distributed ($\tau \sim N(0, \sigma_\tau^2)$).

As an alternative specification in this second step, the dependent variable $\mathbf{SA}$ will be replaced by student's academic track followed after finishing compulsory education. This analysis will be approached by the use of a multinomial logit model and the replacement of the dependent variable of (5) by students' elected high school track ($\mathbf{SAT}$)[162].

$$\mathbf{SAT} = \widehat{\mathbf{PSE}}\varphi_1 + \mathbf{PC}\varphi_2 + \mathbf{SC}\varphi_3 + \mathbf{SCHC}\varphi_4 + \mathbf{SEF}\varphi_5 + \omega \qquad (6)$$

where $\omega$ is the vector of error terms which is hypothesized as $\omega \sim N(0, \sigma_\omega^2)$.

## 5. RESULTS

In this section we present the main results of the analysis. First of all, we begin with a bivariate analysis performed with the variables employed in this section for students' achievement in reading and mathematics and also parental and students' expectations. There is an increasing trend in both competences and expectations for the case of the variables reflecting parental level of studies and household income. This pattern could be a first evidence of a limited socio-economic mobility in the Andalusian society. Students who live with both parents present the highest academic achievement and their parents have the highest expectations; students who

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[161] We have considered that parental expectations are higher or lower than students' when they show a difference of 1 year or more.

[162] We have considered the categories of repeating, high school track of science and technology, and high school track of social and human sciences. The categories of high school track of arts and vocational cycles have not been used due to their low number of observations.

live only with their mother are those who present the highest expectations. Parental involvement in children's homework is negative for children's achievement –as indicated by the literature for secondary school students–, although its influence on expectations is not so clear.

Female students overcome males in both competences and expectations, as also happens for native students compared to immigrants –with the exception of students' expectations, which are slightly higher for immigrants–. Students attending semi-private schools show high achievement in both competences and higher expectations than students from public schools, and the time devoted to homework shows an increasing trend in achievement and expectations with the number of hours. Finally, in the case of the instrumental variables, achievement and expectations increase with the punctuation assigned by parents to the manual skills of their children and those students whose parents work more than eight hours every day present higher values in achievement and expectations. These results for the instrumental variables fit the relationship that may be expected *a priori* for them, to the extent that a high level of manual skills might be denoting that the student is very promising in some field and students whose parents work more than eight hours might be more aware about the importance of a high level of studies to get a good job.

### 5.1. First step of the analysis

Now we move into the estimates of the conditional model. The results for the first step of our analysis are displayed in Table 1.

**Table 1. Estimation of the conditional effect on parental and students' expectations of parental household, parent-children education interaction, student and school variables**

| Variables | Parental expectations | Students' expectations |
|---|---|---|
| **Instrumented endogenous variables** | | |
| Instrumented students' expectations | 0.712* | |
| | (0.416) | |
| Instrumented parental expectations | | 0.544*** |
| | | (0.207) |
| **Household variables** | | |
| Mother answers the questionnaire | -0.022 | -0.065 |
| | (0.091) | (0.076) |
| Father's education level (*Reference group: Lower than primary*) | | |
| Primary | -0.088 | -0.151 |
| | (0.235) | (0.199) |
| Secondary | 0.246 | -0.104 |
| | (0.167) | (0.172) |
| High school | 0.325 | -0.032 |
| | (0.200) | (0.198) |
| University | 0.180 | 0.089 |
| | (0.218) | (0.192) |
| Mother's education level (*Reference group: Lower than primary*) | | |
| Primary | 0.114 | 0.342 |
| | (0.338) | (0.228) |

| Variables | Parental expectations | Students' expectations |
|---|---|---|
| Secondary | -0.016 | 0.433** |
| | (0.336) | (0.196) |
| High school | 0.253 | 0.481* |
| | (0.457) | (0.266) |
| University | 0.202 | 0.681** |
| | (0.568) | (0.293) |
| Household structure (*Reference group: Lives with both parents*) | | |
| Lives only with mother | 0.014 | 0.069 |
| | (0.151) | (0.140) |
| Lives only with father | -0.160 | 0.095 |
| | (0.370) | (0.362) |
| Monthly income level of the household (*Reference group: 1100 Euros or less*) | | |
| From 1101 to 1800 Euros | 0.405*** | -0.067 |
| | (0.157) | (0.167) |
| From 1801 to 2700 Euros | 0.451** | -0.071 |
| | (0.176) | (0.186) |
| More than 2700 Euros | 0.444** | -0.011 |
| | (0.218) | (0.209) |
| Income level missing flag | 0.478** | 0.001 |
| | (0.236) | (0.222) |
| **Parent-Children education interaction variables** | | |
| Parental implication in homework (*Reference group: Not at all*) | | |
| A lot | -0.397* | 0.390** |
| | (0.221) | (0.186) |
| Some | -0.442** | 0.363** |
| | (0.192) | (0.180) |
| A little | -0.281 | 0.419** |
| | (0.253) | (0.173) |
| **Students' variables** | | |
| Female (*Reference group: Male*) | 0.016 | 0.252*** |
| | (0.189) | (0.092) |
| Immigrant (*Reference group: Native*) | 0.058 | 0.048 |
| | (0.225) | (0.215) |
| **School variables** | | |
| Semi-private school (*Reference group: Public school*) | 0.167 | -0.219*** |
| | (0.116) | (0.075) |
| **Constant** | 4.023 | 6.155** |
| | (5.677) | (2.852) |
| *Observations* | 1,092 | 1,092 |
| *R-squared* | 0.501 | 0.483 |

Source: Authors' own calculations from ESOC10-SEN.
Standard errors in parentheses.
*** denotes variable significant to level 1%; ** to 5%; * to 10%.

The results presented in Table 1 show that parental expectations have a positive effect on students' expectations (increasing them in 0.544 years for each additional year of parental expectations), and a similar effect can be found for students' expectations on parents' (with a somewhat higher coefficient of 0.712), which is consistent with the literature regarding other

geographical areas. Another interesting result is that mothers' educational studies help to increase students' expectations. This could be explained by the high influence that mothers might have on their children (Wolfe 1982) and also their higher capacity of leading their children's academic careers (San Román and Goiricelaya 2012).

As can be seen from the estimations, a medium and high family income –as compared to a low family income– suppose higher parental expectations, in line with the results of Davis-Kean (2005) or Froiland and Davison (2014). The variable reflecting parental involvement on children's education –parental help with homework– shows very remarkable results. In the case of students' expectations the effect of this variable is positive, what might be reflecting the belief among students that parents' implication would be an important support for their ulterior success and thus, it enhances children's self-concept (Bodovski 2014). However, this variable has a completely reverse effect for parental expectations (e.g., a high frequency on these practices increased students' expectations in 0.390 years but it decreases parental expectations in 0.397 years). This could be accounting for the perception of parents about the low ability and independence of their children, so they intend to compensate it by providing more help to them (Phillipson 2010), unlike Wang and Benner (2014), who claimed that parents who had higher expectations engaged more in children's homework, as they were trying to promote students' schooling. Moreover, parental involvement may be causing the reduction in the agreement of parental and students' expectations to the extent that they will be moving in opposite directions when these practices are performed.

**Table 2. Instruments' analysis tests**

| Instruments' tests | Instrumental variable for students' expectations (Whether the person of reference works more than eight hours or not every day) | Instrumental variable for parental expectations (Parental opinion on student's manual skills) |
|---|---|---|
| Correlation with parental expectations (Pearson Chi2 Test) | 1.901 | 72.306*** |
| P-value | 0.593 | 0.001 |
| Correlation with students' expectations (Pearson Chi2 Test) | 8.851** | 27.348 |
| P-value | 0.065 | 0.936 |
| Durbin endogeneity test | 0.012 | 0.174 |
| P-value | 0.912 | 0.676 |
| Wu-Hausman endogeneity test | 0.012 | 0.171 |
| P-value | 0.913 | 0.680 |

Source: Authors' own calculations from ESOC10-SEN.
*** denotes variable significant to level 1%; ** to 5%; * to 10%.

In the case of female students their expectations are higher than males (in 0.252 years), what has been highlighted in the literature (Reynolds and Burge 2008), but not in the case of parents, so they may not differentiate between sons and daughters when forming their expectations. We also obtain the interesting result that expectations are not affected by the immigrant status of students (contrary to that claimed by Hao and Bonstead-Bruns 1998). Finally, it could be highlighted that students' expectations are lower when attending to semi-

private schools[163]. This result is contradictory to that obtained in our descriptive analysis, what denotes the richness that conditioning by other variables provides to our results.

From the results of Table 2 it can be observed that the instrumental variable for students' expectations was found to present a significative high correlation with them, but none of it in the case of parental expectations. The opposite situation is found for the instrumental variable replacing parental expectations, what accomplish one of the requirements to be a suitable instrumental variable. In order to further check for the suitability of our instruments, we have performed Durbin and Wu-Hausman tests, which null hypothesis is accepted for both instrumental variables, i.e., we net out the endogeneity problem when using the instrumental variables approach. Besides, first stage F-statistic is significant in both cases, so the selected instruments have explanatory power on the endogenous variables after controlling by the other exogenous variables. In addition, Cragg and Donald (1993) minimum eigenvalue statistics for both instrumental variables coincide with the F-statistic. These results show that our instrumental variables will be appropriate to solve the endogeneity problem that the use of parental and students' expectations could present.

## 5.2 Second step of the analysis

Once the first step of our analysis is completed and "endogeneity-free" parental and students' expectations have been predicted, we performed the second step, whose results are reported in Table 3 (columns 1 and 2).

**Table 3. Estimation of the conditional effect on students' achievement in reading and mathematics –columns 1 and 2– and the likelihood of selecting a determined high school track –columns 3 and 4– of the parental and children's coincidences/discordances in expectations, parental household, student and school variables**

| Variables | Reading | Maths | High school track of sciences and technology | High school track of social and human sciences |
|---|---|---|---|---|
| **Predicted endogenous variables** | | | | |
| Parental and students' coincidences/discordances in predicted expectations (*Reference group: Predicted parental expectations are similar to predicted students'*) | | | | |
| Predicted parental expectations are higher than predicted students' | -0.797*** | -0.614** | -0.884* | -0.458 |
| | (0.272) | (0.272) | (0.524) | (0.490) |
| Predicted parental expectations are lower than predicted students' | -1.027*** | -1.157*** | -1.814*** | -0.576* |
| | (0.209) | (0.210) | (0.412) | (0.336) |
| **Household variables** | | | | |
| Mother answers the questionnaire | -0.220* | -0.165 | -0.354 | -0.403 |
| | (0.132) | (0.132) | (0.292) | (0.284) |
| Father's education level (*Reference group: Lower than primary*) | | | | |
| Primary | -0.250 | -0.111 | -0.586 | -0.556 |
| | (0.335) | (0.339) | (0.731) | (0.711) |
| Secondary | 0.095 | -0.092 | -0.237 | -0.088 |
| | (0.290) | (0.295) | (0.684) | (0.667) |

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[163] The estimations for parental and students' expectations presented in Table 1 were replicated by removing the level of studies of fathers or mothers –alternatively–. In both cases, the coefficient of semi-private schools for parental expectations turned positive and significant, while its effect on students' expectations was negative and significant –as in Table 1–. These tables are available upon request to the authors.

| Variables | Reading | Maths | High school track of sciences and technology | High school track of social and human sciences |
|---|---|---|---|---|
| High school | 0.277 | 0.137 | 0.488 | 0.328 |
| | (0.305) | (0.310) | (0.727) | (0.713) |
| University | 0.160 | 0.021 | -0.203 | -0.228 |
| | (0.310) | (0.314) | (0.721) | (0.708) |
| Mother's education level (*Reference group: Lower than primary*) | | | | |
| Primary | -0.049 | -0.166 | 0.388 | 0.285 |
| | (0.350) | (0.351) | (0.687) | (0.655) |
| Secondary | 0.138 | 0.016 | 0.323 | 0.413 |
| | (0.307) | (0.307) | (0.611) | (0.580) |
| High school | 0.307 | 0.210 | 0.246 | 0.264 |
| | (0.317) | (0.318) | (0.630) | (0.602) |
| University | 0.651** | 0.467 | 1.104 | 0.800 |
| | (0.327) | (0.327) | (0.681) | (0.658) |
| Household structure (*Reference group: Lives with both parents*) | | | | |
| Lives only with mother | 0.113 | -0.080 | 1.568** | 1.172* |
| | (0.248) | (0.248) | (0.719) | (0.711) |
| Lives only with father | -0.370 | -1.065 | -0.264 | -0.947 |
| | (0.678) | (0.671) | (1.177) | (1.292) |
| Monthly income level of the household (*Reference group: 1100 Euros or less*) | | | | |
| From 1101 to 1800 Euros | 0.245 | 0.001 | 0.273 | 0.023 |
| | (0.207) | (0.208) | (0.427) | (0.402) |
| From 1801 to 2700 Euros | 0.192 | 0.070 | 0.515 | 0.199 |
| | (0.229) | (0.231) | (0.478) | (0.454) |
| More than 2700 Euros | 0.398 | 0.472* | 1.017 | 0.627 |
| | (0.270) | (0.272) | (0.633) | (0.615) |
| Income level missing flag | 0.578** | 0.687** | 0.906 | 0.367 |
| | (0.273) | (0.277) | (0.584) | (0.563) |
| **Students' variables** | | | | |
| Female (*Reference group: Male*) | 0.512*** | 0.236* | 0.113 | 0.551** |
| | (0.122) | (0.122) | (0.262) | (0.254) |
| Immigrant (*Reference group: Native*) | -0.942** | -0.792** | -2.265*** | -1.813*** |
| | (0.385) | (0.389) | (0.611) | (0.527) |
| Time devoted to do the homework by the student (*Reference group: Less than 30 minutes*) | | | | |
| From 30 minutes to less than 1 hour | 0.579* | 0.101 | 0.847* | 0.965* |
| | (0.310) | (0.322) | (0.502) | (0.494) |
| From 1 hour to less than 2 hours | 0.653** | 0.090 | 0.837* | 1.292*** |
| | (0.295) | (0.307) | (0.476) | (0.466) |
| From 2 hours to less than 3 hours | 1.049*** | 0.513 | 1.601*** | 1.489*** |
| | (0.307) | (0.318) | (0.531) | (0.524) |
| More than 3 hours | 1.579*** | 1.064*** | 2.488*** | 2.137*** |
| | (0.328) | (0.339) | (0.692) | (0.686) |
| **School variables** | | | | |
| Semi-private school (*Reference group: Public school*) | -0.017 | -0.174 | -0.487* | -0.318 |
| | (0.139) | (0.141) | (0.290) | (0.282) |
| **Constant** | 4.886*** | 5.708*** | 0.198 | 0.224 |
| | (0.496) | (0.505) | (0.988) | (0.951) |
| *Observations* | 1,043 | 1,008 | 1,011 | 1,011 |
| *R-Squared* | 0.148 | 0.131 | | |
| *Pseudo R-Squared* | | | 0.075 | 0.075 |

Source: Authors' own calculations from ESOC10-SEN.
Standard errors in parentheses.
Columns 3 and 4: The reference category of the dependent variable is "Repeat the course". Coefficients represent the multinomial log-odds of the variables.
*** denotes variable significant to level 1%; ** to 5%; * to 10%.

From the view of these results, it can be established that the coincidence between parental and students' expectations is positive for students' achievement, whereas their discordance would mean a reduction in students' achievement, which is higher for both competences when parental expectations are lower than children's. Mother's university education level has a positive effect on students' achievement in reading (increasing achievement in 0.651 points) and high family income level positively influences achievement in mathematics.

Female students show high achievement in reading and mathematics once we control for the differences in expectations –the literature usually highlights the higher scores of female students in reading (OECD 2009; OECD 2010), although none of these papers control for expectations–, while immigrant students obtain lower results –as indicated by authors as Ammermüller (2007)–. Finally, the variable of effort shows that, as it increases, students' achievement also does. This is a relevant result which can indicate that those students with a low socio-economic background can compensate this situation by devoting more time to study.

The results obtained for the alternative specification modeling children's choices after finishing secondary education are shown in Table 3 (columns 3 and 4), being them comparable to that of students' achievement. As it can be seen, the discordance between parental and students' expectations reduces the probability of students to attend sciences and technology track or social and human sciences track in relation to repeating a course –in terms of relative risk ratios (RRR)[164]; e.g., when parental expectations are lower than students' this discordance supposes a RRR for high school track of sciences and technology of 0.163, while it is of 0.562 for social and human sciences track–. Hence, this discordance reduces specially the likelihood of taking the high school track of sciences and technology, as it may be more demanding due to the higher level of achievement and effort that it requires, what could be interpreted as evidence of the importance of parental influence on students' degree election when parental expectations are relatively low –compared to those of students–.

The effect of female students –only for the high school track of social and human sciences– and immigrant status is similar to that obtained for children's achievement, increasing and reducing, respectively, the likelihood of attending to both high school tracks. In addition, a high amount of study hours also increases the likelihood of electing any of the two high school tracks. However, there is the interesting result of students who live only with their mother, what increases their probability to attend to any of the two high school tracks, reflecting the previously stated result that mothers are more able to lead the academic life of their children.

Also relevant is the reduction in the likelihood of attending to the high school track of sciences and technology when students are enrolled in a semi-private school. This might be showing that, in the case of Andalusia, where non-compulsory education is not publicly funded in semi-private schools, students whose families afford the cost of attending to these –private– high schools are –in general– those less academically "successful".

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[164] Relative risk ratios are calculated by the exponentiation of the values of the coefficients in Table 3 (columns 3 and 4).

## 6. CONCLUSIONS

We have analyzed the effect of parental and children's expectations agreement –or disagreement– on children's achievement and on their elections of alternative high school tracks in the context of the Spanish autonomous community of Andalusia. A noteworthy result, which has also been highlighted in the literature for other regions, is the reciprocal relationship that exists between parental and children's expectations, due to them being simultaneously determined. This has supposed the need to employ an "endogeneity-free" approach, which has successfully dealt with this problem and has provided us with more reliable results.

Thus, once managed this issue, the coincidence between parental and children's expectations has been found to be a relevant aim, to the extent that it could foster children's achievement and the likelihood of electing both analyzed high school tracks. Because of that, to achieve this objective, schools should provide an adequate environment of communication and feedback for parents in order to keep them informed about the performance and the problems that their children could be facing, and also to encourage them to discuss these topics with their children. In addition, investment on university degree and professional tracks information ought to be done, which should be supplied to both students and parents before the election of high school specialization –e.g., by university and professional orientation visits or conferences– and not in the last course of high school –as usually happens–. This may also have a positive economic repercussion, in so far as the costs of wrong degree choices could be attenuated. Then, students and parents should have more information on academic possibilities, so we could be moving towards an agreement between their expectations and, thus, a higher education achievement and the reduction in the waste of economic resources.

Another relevant result is that the effect of parental involvement –i.e., their help with school tasks– on expectations has appeared to be of opposite sign for parents and students, what denotes the existence of a trade-off between them. Consequently, when these practices are performed, parental and children's expectations may be moving in opposite directions, what could be causing them to disagree more and, hence, contributing to reduce students' achievement and their likelihood of selecting both analyzed high school tracks. It is important to bear in mind that these negative results of parental involvement are shown by students aged 14-15 –an age in which, additionally, the contents of the subjects are harder and parents are less able to help students with them–, as the literature has stated that parental involvement in earlier ages is positive (Froiland et al. 2012). Because of that, it is essential that both schools and parents had provided to children a proper education on their autonomy and problem resolution procedures before adolescence, so they would not need the help of their parents with schoolwork at this age. In the case that this autonomy has not been reached by the student at that time, teachers' curriculum should have prepared them to supply their students with study, comprehensive reading, scheduling and synthesizing techniques in order to provide them with learning autonomy –practices which frequently receive less attention when conducting lessons, limiting them only to teach the contents of the subject–. In addition, these procedures should not only be known by students, but also by their parents, so they

would be aware of their children's need to develop these skills by themselves, avoiding their excessive involvement in schoolwork and, thus, the obstruction of children's academic development.

The conclusions of our research have an extension in terms of the resilience concept. From the analyses of expectations we can conclude that they hamper the opportunities of students from less economically advantaged social groups, due to parental expectations being widely affected by the level of income of the household. This is a problem which should be solved to reach a more meritocratic society. In this respect the –above mentioned– greater interaction of teachers and parents to foster a better understanding of the actual development of the student and therefore an adjustment of parental expectations should be particularly intensive for parents from low socioeconomic environments. Likewise the implementation of external assessment tests at different stages of the academic track, as a consequence of the recently approved law for the improvement of the Spanish primary and secondary educational quality (LOMCE[165]), could also contribute to improve the knowledge of parents on the actual competences of the students.

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