

Teaching Practices and Social Capital¹

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Abstract

We use several data sets to consider the effect of teaching practices on student beliefs, as well as on organization of firms and institutions. In student level data, teaching practices (such as teachers lecturing versus students working in groups) exert a substantial influence on student beliefs about cooperation both with each other and with teachers. In cross-country data, teaching practices shape both beliefs and institutional outcomes. The relationship between teaching practices and student test performance is nonlinear. The evidence supports the idea that progressive education promotes social capital.

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1. Introduction

Since the path-breaking work of Banfield (1958), Coleman (1990), and Putnam (1993, 2000), social scientists have argued that social capital, defined broadly as the capacity of people in a community to cooperate with others outside their family, is an important determinant of various social outcomes. The list of such outcomes includes the provision of public goods (Putnam 1993), economic growth (Knack and Keefer 1997, Algan and Cahuc 2010), formation of large firms and organizations (La Porta et al. 1997), financial development (Guiso et al. 2004), trade (Guiso et al. 2009), as well as methods of state intervention (Djankov et al. 2003, Aghion et al. 2010). Many social scientists have also argued that social capital is highly persistent over time (Putnam 1993, Guiso et al. 2007), largely because the underlying beliefs regarding the benefits of trust and cooperation are transmitted in communities through families (e.g., Bisin and Verdier 2001, Tabellini 2008, Guiso et al. 2008) or social interactions (Benabou and Tirole 2010).

In this paper, we explore an alternative, and complementary, mechanism of how social capital is transmitted in a community, namely schooling. Aghion et al. (2010) and Guiso et al. (2010) note that schools rather than families might contribute to such transmission. There is some evidence that a greater *quantity* of schooling leads to higher social capital (Milligan et al. 2004, Helliwell and Putnam 2007, Glaeser et al. 2007) and has other desirable non-pecuniary benefits (Oreopoulos and Salvanes 2011). Our emphasis will be not on the quantity of schooling, but on *how* students are taught. The idea that how students are taught shapes their beliefs is of course not new. Teaching students ethics and civics are established goals of school systems in many countries, and forms the basis of the progressive education movement (Dewey 1944). More recently, the leftist critique of capitalist education (Bourdieu and Passeron 1970, Bowles and Gintis 1976) sees these objectives as mechanisms of perpetuating the social order. Our paper can be seen as an empirical exploration into the effects of progressive education.

Our starting observation is that the methods of teaching differ tremendously across countries, and between schools within a country. Some schools emphasize what we call vertical teaching methods, whereby teachers primarily lecture, students take notes or read textbooks, and teachers ask students questions. The central relationship in the classroom is between the teacher and the student. Other schools emphasize what we call horizontal teaching methods, whereby students work in groups, do projects together, and ask teachers questions. The central relationship in the classroom is among students. Consistent with the idea that beliefs underlying social capital are acquired through the practice of cooperation, we hypothesize that horizontal teaching methods are conducive to the formation of social capital, whereas vertical teaching methods are not.

To pursue our study, we assemble data on teaching methods across schools from several multi-country data sources. The three data bases we examine are 1) the Civic Education Study (CES), run in 1999 in 23 countries to assess the level of civic knowledge of mostly 14 year olds in the 8th and 9th grades, 2) the Trends in International Mathematics and Science Study (TIMSS), conducted in 1995 in 33 countries and focused similarly on the 8th graders, and 3) the Program for International Student Assessment (PISA), which we use for 2000 and 2003 waves for 15 year olds in 36 countries. The CES data in particular contains a great deal of student-specific information about student beliefs and characteristics, as well as characteristics of their teachers and their schools, including most importantly teaching methods. In our empirical work, we emphasize the distinction between “teacher lectures” and “students work in groups” as measures of vertical and horizontal teaching methods. We can then use the CES at the student and school level to relate teaching methods to student beliefs, and use all data sources at the country level to relate teaching methods to a variety of measures of both beliefs and social outcomes.

In doing so, we seek to address four questions. First, do teaching methods vary systematically across countries? The answer to this question is a clear yes. Second, do teaching methods matter for student beliefs? The answer is again a clear yes. There are strong correlations between teaching methods and student beliefs both in a cross-section of countries, and more importantly, in a cross-section of students in the CES sample, holding constant country fixed effects, as well as a variety of student, school, and teacher characteristics.

Third, do the differences in teaching methods reflect only the differences in the beliefs or preferences of the community or do they perhaps also have an independent component that shapes student beliefs? If teaching methods entirely reflect community preferences, then one might still argue that only families shape beliefs, and schools merely reinforce what families teach kids already. If teaching methods have an independent component, there is a possibility that schools can build social capital even in communities where parents lack it.

This question is obviously very difficult to answer. We try to address it in two ways. First, we run student-level regressions controlling for teachers’ social capital, on the assumption that teacher beliefs capture community preferences. We find that, even holding teacher beliefs constant, teaching practices are strongly correlated with student beliefs, which provides some evidence for the hypothesis that schools may matter beyond families. Second, we use an instrumental variables approach based on the finding that female teachers, other things equal, are more likely to utilize horizontal teaching methods. We argue that teacher gender is a valid instrument for teaching

practices, and find some (weaker) evidence that even in instrumental variable specifications, teaching practices affect student beliefs.

Having established the strong relationship between teaching practices and student beliefs, we turn to the cross-country evidence and ask whether teaching practices are related to a broader set of beliefs and social outcomes. In all cross-country specifications, we control for per capita income and average years of education, but the issue of omitted variables still looms large here.

We find a variety of interesting correlations. In terms of beliefs, students in countries with vertical teaching methods assess a lower value of cooperation with other students and have a lower view of teacher fairness and willingness to listen than do students in countries with horizontal teaching methods. Vertical teaching is also associated with greater belief that it is the duty of children to respect their parents. Such methods are associated with students feeling “like an outsider” and “awkward and out of place” in the classroom (from PISA), and are highly negatively correlated with trust and association membership, the two standard measures of beliefs underlying social capital from the World Values Survey. Finally, vertical teaching methods are associated with lower trust in civil servants and lower level of belief that civil servants treat citizens fairly (both measures from the International Social Survey Program). It appears that subordination to teachers as a student leads to a feeling – and perhaps a reality -- of subordination to bureaucrats as an adult.

With respect to “real outcomes” as opposed to just beliefs, we looked at organization of firms, which some studies find to be related to social capital (La Porta et al. 1997, Bloom et al. 2007). We find that vertical teaching methods are associated with lower assessed incidence of delegation of authority in firms (Global Competitiveness Report) and lower perceived freedom of daily work organization (European Social Survey). Again, teaching practices appear to translate into work practices, suggesting that social skills learned in school are used later. We also find that vertical teaching methods are related to a perception of inferior labor relations. Perceived unfairness of teachers may lead to that of bosses.

We also look at two measures of institutional quality: the (subjective) government effectiveness index from Kauffman et al. (2008) and the objective measure of entry regulation from Djankov et al. (2002). In an earlier paper (Aghion et al. 2010), we argued that low levels of social capital lead people to demand government regulation, even if they perceive government officials to be corrupt, largely because they distrust businesses more. On that theory, vertical teaching methods, in so far as they build low levels of social capital, should be associated with lower government effectiveness and higher entry regulations. We find that this is indeed true in the data.

As a final step, we use student level data to ask whether educational quality might be compromised by teaching practices favorable to the formation of social capital. We find that extreme bias toward some teaching practices is detrimental to test scores, and that some mixture of horizontal and vertical teaching practices supports best academic performance.

Section 2 describes our data sources and measures of teaching methods. Section 3 presents the micro evidence on the relationship between teaching methods and student beliefs. Section 4 looks at the macro correlations. In Section 5, we consider student test scores. Section 6 concludes.

2. Teaching practices and Student Beliefs

This section investigates the relationship between teaching practices and individual student beliefs about cooperation. We start by presenting the data on teaching practices from the CES. We show that countries and schools differ a lot in their reliance on what we call vertical and horizontal teaching practices. We then briefly consider the determinants of teaching practices using our micro data, where an observation is a student teacher pair. We next turn to estimating the effect of teaching practices on student beliefs in the micro data. We start with OLS specification, but then focus on the IV specifications using teacher gender as an instrument. There is some evidence of causality and not just of a correlation between parental beliefs in a school as expressed in that school's teaching practices and student beliefs.

2.1. Database on Teaching Practices and Student Beliefs

Our analysis of the association between teaching practices and student social capital draw on the "Civic Education Study" (CES), a survey run in 1999 by the International Association for the Evaluation of Educational Achievement (IEA). The CES is designed to assess the civic knowledge of students in grade 8 (or grade 9 for certain countries). Our study covers 23 countries: Australia, Bulgaria, Cyprus, Czech Republic, Denmark, England, Estonia, Finland, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Norway, Portugal, Romania, Russian Federation, Slovak Republic, Slovenia, Sweden, Switzerland, United States.

The assessment is designed to measure various dimensions of civic knowledge, including concepts of democracy and citizenship, attitudes to institutions, trust and civic behavior, as well as beliefs about cooperation among students and cooperation between students and teachers. In

addition to the individual student survey, the CES includes school-principal and teacher background questionnaires. Critically, the teacher questionnaire requests detailed information on teaching practices of the teachers. Each of the participating countries randomly samples the students to be surveyed using a two-stage stratified sampling design. The primary sampling unit (PSU) is the schools randomly selected in each country. The students from grade 8 are then randomly picked from the assigned class in the selected school. The teachers of those selected students complete individual surveys (as did school principals). For students with multiple teachers (up to a maximum of five in the database), all the teachers complete the questionnaire.

The individual teacher surveys ask the following questions about teaching practices: « In your class, a) How often do students work in groups? b) How often do students work on projects ? c) How often do students study textbooks? , d) How often do students participate in role play, e) How often does the teacher lecture? , f) How often does the teacher include discussions, g) How often does the teacher asks questions? ». The answers take on values 1 for Never, 2 for Sometimes, 3 for Often and 4 for Very Often.

At the student level, in addition to questions about beliefs discussed below, the measured characteristics include age, gender and immigration status (dummy equal 1 if the student is born abroad and 0 otherwise). We control for the socioeconomic background of the parents by including their education, equal to 1 for No elementary school, 2 for Completed elementary school, 3 for High School, 4 for Completed High School, 5 Higher technical education, 6 for Some college – university degree, and 7 for Graduate degree. We also use student responses on the number of books at home, equal to 1 for None, 2 for One-Ten books, 3 for Eleven-Fifty Books, 4 for Fifty one- One hundred books, 5 for One-hundred and one-Two hundreds books, and 6 for More than two hundred books. This variable has been found to be a more cross-country comparable measure of family background than parental education, and is the single most important predictor of student performance (Hanushek and Woessmann, 2010). Schuetz et al (2008) show that the number of books at home is a good proxy for household income, which is not reported in the CES.

At the teacher level, the survey includes information on teacher's age, gender, highest level of formal education, and years of experience. We also use questions about teachers' beliefs in cooperation as proxies for their social capital, which they might transmit to students. If geographic mobility of teachers is low, their level of social capital might be a proxy for the local social capital in the area where students live. We use this information as an additional control to isolate the specific role of teaching practices on student beliefs, which roughly holds constant social capital in the geographic location, and thus, perhaps, in the family.

We measure teachers' social capital with the following questions: "How much confidence do you have in the political system?", "How much confidence do you have in elections?", "How much confidence do you have in the judicial system?", "How much confidence do you have in immigration?", "How much confidence do you have in social welfare?", "How much confidence do you have in labor unions?". The answers equal 1 for "Not at all", 2 for "Little confidence", 3 for "Confident" and 4 for "Very confident". We create an index of "Teacher's social capital" by taking the average of these answers, which ranges between 1 and 4.

At the school level, the principal's questionnaire covers the size of the class being interviewed and whether the school is public or private. The questionnaire also reports the fraction of students in the school from low socio-economic backgrounds. This question is not reported for all countries (e.g., not for Great Britain and the United States) and is used only for robustness checks.

Table A1 in the Appendix presents the definition and descriptive statistics of all the variables we use from the CES. The sample covers 3,934 schools, with an average of 150 schools per country, 3,413 students per country, and an average of 1,68 teacher per student.

2.2 Teaching Practices and their Determinants

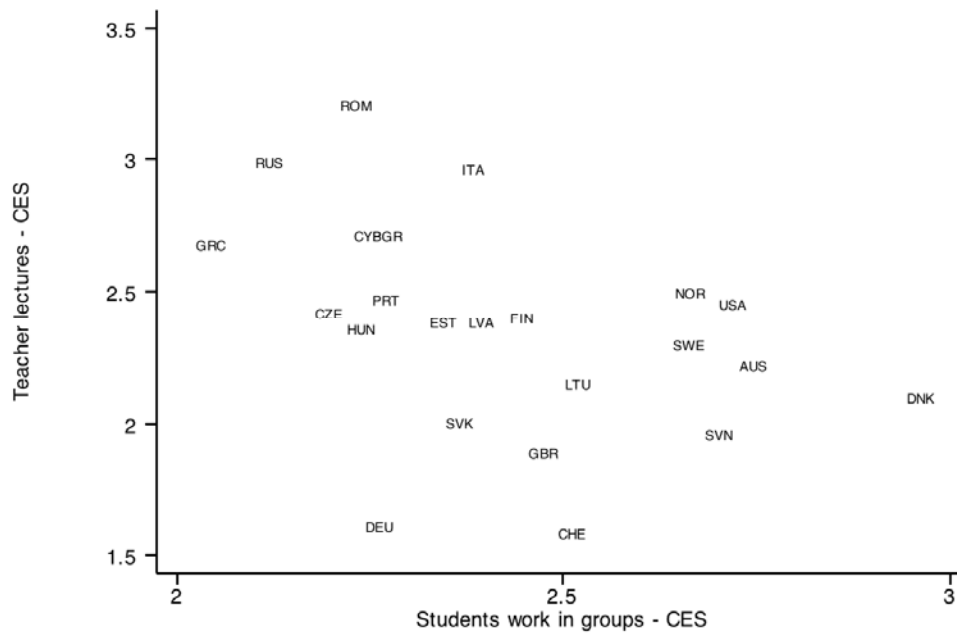
2.2.1 Variation across countries and schools

To capture the contrast between vertical and horizontal teaching practices, we focus on the two main teaching practices from the CES, "Teacher lectures" and "Students work in groups." Figure 1 presents the correlation between country average scores of "Students work in group" and "Teacher lectures" taken from the CES. The higher is the value of these indicators, the more frequent are these teaching practices based on teacher surveys. Figure 1 shows a negative cross-country correlation between these two practices, with the coefficient of correlation equal to -0.418. Students work in groups more in Nordic countries (Denmark, Norway, Sweden) and Anglo-Saxon countries (Australia, United States and to a lesser extent Great Britain). This teaching practice is less common in East European countries and the Mediterranean (Greece, Cyprus, Portugal and, to a lesser extent, Italy). In contrast, in East European and Mediterranean countries, teachers spend more time lecturing. Figure 1 also suggests that in countries such as Germany and Switzerland teachers combine the two practices, or do something else with their class time.

Table A2 in Appendix reports the descriptive statistics for the mean and standard deviation of teaching practices for each country. Countries differ substantially in the extent of variation in

teaching practices across schools. Nordic countries including Denmark, Norway or Sweden exhibit lower variation across schools in the practice “teacher lectures”, followed by Germany, Switzerland and Germany. Eastern European countries display above average variation in lecturing. United Kingdom and the United States are close to the cross-country average.

Figure 1 – Cross-country correlation in teaching practices: Teacher Lectures versus Students Work in Groups –(1=Never, 2=Sometime, 3=Often, 4=Always). Source: CES



2.2.2 Sources of variation of teaching practices across schools

We begin by discussing the sources of variation in teaching practices across schools and within countries. We look at the relationship between teaching practices and observable characteristics at the class and schools levels. The dependent variable is the teaching practice of a given teacher, with each student of that teacher entering as a separate observation. We control for the individual characteristics of each student in the class of the teacher, including gender, immigrant status, age, education level of the parents, and the number of books at home. We also include the individual characteristics of the teacher: age, gender, level of education, years of experience, as well as the social capital of the teacher. Finally, we include the average characteristics of the school: whether the school is public or private, the size of the classroom, and the fraction of students who come from below average family socioeconomic backgrounds.

Table 1 presents the results of regressing teaching practices “Teacher Lectures” and “Work in groups” on the set of observable characteristics of the teachers, the school and the family background of the students. We run OLS regressions with country fixed effects to focus on within country variation across schools. We cluster standard errors at the student level. The results are similar if we cluster standard errors at the teacher or school level.

Table 1 shows that teaching practices are correlated with some observable characteristics of the students and of the school. “Students work in groups” rises with mother’s education and teacher gender. “Teacher Lectures” falls with immigrant status of the student, teacher gender, and the fraction of students in the school from low socio-economic backgrounds. It however also rises with teacher social capital. The strongest and most consistent predictor of teaching practices appears to be the teacher’s gender: women are more likely to rely on horizontal, and less likely on vertical, teaching practices. In later analysis, we use teacher gender as an instrument for teaching practices.

2.3 Teaching practices and individual Student Beliefs: OLS estimates

2.3.1 Basic OLS estimates

We run OLS regressions of student beliefs on teaching practices with various controls. When we have data on multiple teachers for the same student, we use each pair as a separate observation. We cluster standard errors at the student level. The results are similar when we cluster at the school level. The results are not markedly different when we consider the average characteristics across different teachers of a given student, rather than treating each teacher student pair as a separate observation. The relationship between student beliefs and teaching practices is not statistically significant, however, when we run the estimates with school fixed effects, i.e., look at the variation in teaching practices within school. We include country fixed effects in all the regressions. We thus exploit the variation in teaching practices across schools, making it possible to disentangle the specific role of teaching practices on students’ beliefs from other national characteristics such as social capital or institutions.

We first estimate the relationship between student beliefs about cooperation among themselves and teaching practices. From the student survey, we use the following two questions: “The goal of education is to understand people with different ideas” and “The goal of education is to learn how to cooperate in groups with other students”. The answers range from 1 for Strongly

Disagree, 2 for Disagree, 3 for Agree and 4 for Strongly Agree. The indicator “Belief in cooperation between students” takes for each student the average of the two answers, ranging from 1 to 4.

The OLS results for student beliefs in cooperation with other students are reported in Table 2. Column 1 shows that such beliefs are negatively related to “Teacher lectures”, with the coefficient statistically significant at the 1 percent level. In contrast, the belief in cooperation among students is positively related to “Students work in groups.” The coefficient is positive and statistically significant at the 1 percent level. There are a number of other important effects. Female students are firmer believers in cooperation with other students, as are students coming from households with more books. Larger class size is significantly associated with weaker beliefs in cooperation among students. Finally, this belief is significantly stronger among students in public schools. We do not pursue these interesting results here, but note that the student gender result is in line with Grosos and Gneezy’s (2009) finding of important gender differences in experimental public good games.

How large are the parameter estimates on teaching practices? Raising “Students work in groups” by one point increases the belief in cooperation among students by 0.0120, or 2.14 percent of the standard deviation. Raising “Teacher lectures” by one point decreases that belief by 0.0125, or 2.23 percent of the standard deviation. These effects appear modest, but perhaps not compared to those of the other teacher and school characteristics. For example, the class size needs to be reduced by a third to increase the belief in cooperation among students by .01 points.

The second aspect of student social capital is belief in cooperation with their teachers. We use the following related questions from the student questionnaire: “Are students encouraged to make up their own opinion?”, “Do teacher respect your opinion?”, “Do you feel free to express opinions in class?”, “Do you feel free to openly disagree with the teacher?”. The answers range from 1 for strongly disagree, 2 for disagree, 3 for agree, to 4 for strongly agree. We use these answers to create an index “Belief in cooperation between students and teachers”, which ranges from 1 to 4.

Table 3 - Column 1 shows that the belief in cooperation with teachers is positively and significantly (at the 1 percent level) related to “Students work in groups.” A one point increase in this practice is associated with a rise by 0.0235 in the belief in cooperation with teachers, or 3.6 percent of a standard deviation. Table 3 - Column 2 shows a negative relationship between student “Belief in cooperation with teachers” and “Teacher lectures”. This effect is statistically significant at the 1 percent level. Raising “Teacher lectures” by one point is associated with a drop of 0.0106 in the “Belief in cooperation between students and teachers”, or 1.6 percent of a standard deviation. Other important influences on student beliefs in cooperation with teachers include student gender, father’s education, the number of books at home, teacher’s age, teacher’s education (which enters

negatively!), teacher's experience (which also enters negatively), class size, the status as a public school (which unlike in Table 2 enters negatively), and in one specification teacher social capital. When we compare coefficient sizes, teaching practices appear as an important influence.

The third dimension of students' social capital is their participation in civic life. Table 4 shows the relationship between teaching practices and the involvement of students in associations. The student survey proposes 15 potential organizations: "Have you ever participated in: A student council? A youth organization? A school newspaper? An environmental organization? A U.N or UNESCO Club? A Student exchange program? A Human Rights Organization? A Group Conducting Activities? A Charity Collecting ? A boy or girl scout group? A cultural association? A computer club? An art, drama or music association? A Sport Organization? An association supported by a religious group?" For each association, the answer is 1 if the respondent participates and 0 otherwise. We sum up the answers to get a measure of *Association membership*, varying between 0 and 15.

Table 4 shows that Association membership is positively related to "Students work in groups"; the coefficient is statistically significant at the 1 percent level (Column 1). In contrast, there is a negative relationship between Association membership and "Teachers lectures"; although the coefficient is not statistically significant. Raising by one point "Students work in groups" increases the number of memberships by 0.054, which is 2.33 percent of a standard deviation. The other statistically significant determinants of memberships are student gender, father's and mother's education, the number of books at home, teacher education (weakly), class size and public status of the school, but teaching practices have a large effect compared, for example, to class size.

Finally, we look at the relationship between teaching practices and trust. From the CES, we use the following questions: "How much confidence do you have in: i) Courts? , ii) The Police?, iii) Education institutions/Schools? , and iv) The people who live in this country ?". The answers range from 1 for "Not at all", 2 for "Little confidence", 3 for "Confident" and 4 for "Very confident". We take the average of these four answers to construct an index of "Trust", ranging between 1 and 4.

Table 5 shows that "Trust" is positively related to "work in groups" and negatively related to "teacher lectures." The coefficient is statistically significant at the 5 percent level for "work in groups." Female gender of the student is weakly positively associated with trust, but mother's education and immigrant status are negatively associated with trust. Teacher education is positively but inconsistently associated with student trust, public school status has a positive effect, and class size has a negative effect. The evidence on trust is a bit weaker than that on other measures of social capital, yet still continues to point in the direction of importance of teaching practices, and in particular of the benefits of horizontal teaching methods, and costs of vertical ones, for social capital.

2.3.2 The Effects of Teaching practices on Students from Different Backgrounds

We briefly assess whether the relation between teaching practice and social capital is different for different groups of students. We compare the relationship in schools with few versus many students from poor socioeconomic backgrounds. From the school principal surveys, we can compute the national average share of students from low socioeconomic backgrounds across schools, and distinguish schools that are above or below this threshold. We have not used this characteristic in the previous estimates due to the lack of data for four countries of the sample. We obtain similar results when we use the class average number of books relative to the national average as an indicator for poor socioeconomic background.

Table 6 shows that the effect of teaching practices on student beliefs in cooperation among themselves and with teachers is particularly pronounced in schools with a high share of students from low socioeconomic backgrounds. The coefficients on teaching practices are statistically significant in these schools, but not in schools with below average share of students from poor backgrounds. We get similar results for the student level of trust and association memberships. These results might be particularly interesting if communities are focused on raising the level of social capital of students from low socioeconomic backgrounds.

2.4 Identification

So far, all the regressions control for country-fixed effects, identifying the effects of teaching practices from teacher differences. This strategy makes it possible to disentangle the role of the teacher (or the school) from national educational policies or national social capital. But teaching practices might still reflect, at the local level, the beliefs of the parents or of the local community, even after controlling for teacher social capital. We know that teacher gender is a significant predictor of teaching practices, and we suggest that it is likely to be uncorrelated with unobserved community characteristics such as beliefs. Accordingly, teacher gender can be a valid instrument for teaching practices.

Recall that Table 1 shows that teacher gender is a significant predictor of teaching practices. A female teacher increases by 0.29 the frequency of the practice “Students work in groups”, which corresponds to 36.44 percent of the standard deviation in this teaching practice. The relationship is statistically significant at the 1 percent level, and the F-test of a weak instrument is rejected. A female teacher decreases by 0.17 in the practice “Teacher lectures”, which is 19.31 percent of the

standard deviation of this practice. The F-test of weak instrument is also rejected. Naturally, women could be more cooperative and trusting in general than men. They can thus shape student beliefs through channels other than their teaching practices. However this concern can be at least partially mitigated. First, we include a measure of the teacher's social capital in the regressions. Second when we include both the teacher's social capital and the teacher's gender in specifications such as those in Tables 2-5, teacher gender is not statistically significantly correlated with student beliefs. This is an indication that the exclusion restriction is not violated, although only a formal over-identification test with more than one instrument could rule out this possibility.

An additional potential concern is that the allocation of the teachers across the different schools might not be independent of their gender. Women could tend to sort into places according to the level of social capital. Parents or students with higher social capital could purposely choose schools with a higher fraction of female teachers. This strikes us as a somewhat remote possibility. Nonetheless, we investigate the relationship between teacher gender and the available characteristics of schools and students. We find that teacher gender is statistically significantly correlated with the share of girls in the classroom and the average education of the mothers – neither obviously related to community level of social capital. We include these and many other observable characteristics in both first stage and second stage regressions.

Tables 7 and 8 report the second stage estimates of the instrumented teaching practice “Students work in groups” and “Teacher lectures” on students’ beliefs, with teacher gender used as an instrument. The results are statistically significant for the belief in cooperation among students for both “teacher lectures” and “students work in groups” teaching practices. The second stage estimates are not significant for the other student’s attitudes though. We take this evidence as providing some but not overwhelming support for the causal influence of teaching practices.

3. Teaching practices and Aggregate outcomes

3.1 Cross-country comparisons on teaching practices

Turning to the aggregate implications of teaching practices for social capital, we assess cross-country relationships between teaching practices measured at the country level and various social outcomes, including trust and civic life, but also the organization of firms and institutions. Looking at the aggregate data has the advantage that he can consider both beliefs and “real outcomes,” although concerns with omitted variables might be greater than with the micro data.

In this section, we measure teaching practices at the country level by using Trends in International Mathematics and Science Study (TIMSS). TIMSS is a multi-country comparative test of student cognitive achievement in math and science, conducted in 1995 by the IEA, the same international consortium that constructed the CES database. TIMSS is also targeted to students belonging to grade 8th and cover up to 36 countries: Australia, Austria, Belgium, Bulgaria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Iran, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Netherlands, Norway, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States. The database combines information from student, school principal, and teacher questionnaires for a representative sample of students.

The TIMSS database has the advantage of covering more countries than the CES data used in the micro estimates. In addition, TIMSS covers more diverse countries (the CES is mainly centered on European countries). Unlike the CES, TIMSS does not have specific questions on student beliefs, since the primary focus of this study is the assessment of cognitive performance. However, the student questionnaire does ask specific questions about teaching practices for a larger and more diverse group of countries than the CES. Teaching practices are measured from the individual student surveys conducted in all classrooms in each selected school. The survey covers the classes in mathematics, science, biology, chemistry and earth science. We focus on teaching practices in mathematics, which allow observations for the maximum number of countries.

The questions on teaching practices most related to our analysis are: *“In schools, how often do you do these things? Copy notes from the board during the lessons? , Work together in pairs and small groups in class?”* The answers range from 1 for All the time, 2 for Often, 3 for Sometimes, to 4 for Never. We reverse the order of the answers to get a scale comparable to that of the CES. The higher is the value of the TIMSS indicator, the more frequent is the teaching practice. Fortunately, the indicators of teaching practices from CES and TIMSS are highly correlated with each other. The cross-country correlation between averages of “Teacher lectures” from CES and “Students take notes from the board” from TIMSS is 0.328. The corresponding correlation between “Students work in groups” from CES and TIMSS, respectively, is 0.598. This correlation pattern shows the consistency of the practices across surveys. The phrasing of the questions differs between CES and TIMSS, but they capture the same broad contrast between vertical and horizontal teaching. This comparison also suggests, importantly, that the students and the teachers share the same perceptions of teaching practices, since the questions are administrated at the teacher level in CES and at the student level in TIMSS.

3.2 Teaching practices and Students Beliefs in Cooperation

We first investigate the cross-country relationships between teaching practices and student beliefs in cooperation, similarly to what we did at the individual level in Section 2.

We use a comprehensive set of student attitudes toward cooperation at school from the Program for International Student Assessment (PISA). This survey was conducted in 2000, 2003 and 2006 by the Organization for Economic Cooperation and Development (OECD). The PISA survey is meant to provide international comparison of cognitive skills of students who are 15 years old, by asking standardized questions in mathematics, science, reading, and problem-solving. Information on the way schools are run is collected through a school principal questionnaire. PISA does not include a teacher survey and, unlike the CES and the TIMSS, does not report teaching practices in detail. But the background student questionnaire provides an indication of student perception of cooperation among students, as well as between students and teachers. These questions are available in the surveys 2000 and 2003 for 30 countries for which we also have observations for our control variables: Australia, Austria, Belgium, Bulgaria, Chile, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Italy, Japan, Korea, Latvia, Netherlands, Norway, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States.

The regressions include several controls. The first is the level of education from the Barro and Lee database for 2000. Education has been found to be crucial in explaining various civic outcomes as well as the development of democracy (Lipset 1959, Milligan, Moretti, and Oreopoulos 2006, Helliwell and Putnam 2007, Glaeser, Ponzetto and Shleifer, 2007). Another concern is that teaching practices proxy for per capita income. In poor countries, it might be less costly for teachers to lecture than to ask students to work in groups. We control for total annual expenditure per student in public institutions for secondary education, which corresponds to the grades where teaching practices are measured in TIMSS. Total expenditure per student is calculated as a percentage of GDP in US 2002 dollars adjusted for PPP. The data come from UNESCO. An additional control is GDP per capita, expressed in US 2000 dollars. These last two controls are highly correlated.

3.2.1 Cooperation between students and with teachers

From PISA 2000 and 2003, we use the following statements concerning cooperation between students: “I enjoy working with other students in groups”, “When we work on a project, I think that it is a good idea to combine the ideas of all the students in a group”, “I do my best work when I work

with other students” and “I learn most when I work with other students in my class”. The replies to each statement range from 1 for Strongly disagree, 2 for disagree, 3 for Agree, and 4 for Strongly agree. To ease the interpretation of the results, we create a dummy for each question which equals 0 if the response is “strongly disagree” or “disagree”, and 1 if the response is “agree” and “strongly agree”. The country level of the variable thus measures the share of students who agree or strongly agree with the statement. We also create a synthetic indicator of “student cooperation” at the country level by taking the average over the four questions of the share of students who agree or strongly agree with the statement. The index varies between 0 and 1.

Table 9, Columns 1-3 report the OLS cross-country estimates controlling for (ln)-school expenditure per student, the (ln) income per capita, and average years of education. Column 1 shows a strong negative relationship between “student cooperation” and the country share of students who never work in groups. The coefficient is statistically significant at the 1 percent level. Column 2 shows a negative association between “student cooperation” and the country share of students who always take notes from the board; the relationship is statistically significant at the 10 percent level. Column 3 reports that the relationship is statistically significant at the 1 percent level for the Gap between country average share of taking notes from the board and country average share of working in groups. Twenty-one percent of the cross-country variation in beliefs about student cooperation is explained by this Gap between vertical and horizontal teaching methods.

The size of the coefficients is substantial. Teaching practices are the only variables statistically significantly related to “student cooperation”. None of school expenditure per student, income per capita, or average years of education is related to student attitudes toward cooperation. To ease the interpretation, we look at the estimates using each question separately rather than their average. An increase by one-standard deviation (across countries) in the share of students who always take notes from the board is associated with a decrease of 8 percentage points in the share of students who agree or strongly agree with the statement “I enjoy working with other students in group”. An increase by one standard deviation in the share of students who never work in groups is associated with a decrease by 7 percentage points in the share of students who agree or strongly agree with the statement: “I learn most when I work with other students in my class”.

We next turn to the relationship between teaching practices and cooperation between teachers and students. We measure this relationship using student beliefs from PISA. Students are asked to consider the following statements: “In general teachers treat me fairly”, “In general students and teachers get along”, “In general the teacher listens to me”. The responses range from 1

for Strongly disagree, 2 for Disagree, 3 for Agree and 4 for Strongly agree. To measure the country level of cooperation with teachers, we create for each statement a dummy equal to 1 if the answer is agree or strongly agree, and 0 if the answer is disagree or strongly disagree. We also look at an indicator of “cooperation with teachers” by taking the average of these dummies over the three statements. Table 9 shows a strong negative relationship between “cooperation with teachers” and the country share of students who never work in groups (Col. 4), who always take notes from the board (Col. 5), or who see a larger Gap between Notes and Groups. The correlations are statistically significant at the 5 or 1 percent level. Twenty-three percent of the cross-country variation in “cooperation with teachers” is explained by the country share of students who never work in groups.

We complement this analysis by looking at the relationships between teaching practices and beliefs about family life. From the World Values Surveys 2000, we use the question: “Children should respect their parents regardless of their merits and their faults”. The variable equals 1 if the answer is yes, and 0 otherwise. We calculate the country share of positive answers to this question for the countries that are also included in TIMSS and for which we have observations on teaching practices. Table 10 – Col. 1-3 show that teaching practices are related to attitudes toward hierarchical relationships between children and parents. The country share of students who always take notes from the board is positively related to share of individuals agreeing with the statement that children must always respect their parents. The relationship is statistically significant at the 1 percent level, and 45 percent of the cross-country variation in family values is explained by the cross-country variation in this teaching practice.

Table 10 – Col. 4-6 explore the relationship between students’ feeling alienation and the teaching practices. From PISA, we take two related questions: “In general, do you feel like an outsider in your class?”, “In general, do you feel awkward in your class?”. The answers range from 1 for Strongly disagree, 2 for Disagree, 3 for Agree to 4 for Strongly agree. We create a dummy for each question equal to 1 if the answer is agree or strongly agree, and 0 if the answer is disagree or strongly disagree. We then create a measure of student alienation by taking the average of these dummies. Table 10 shows that feelings of alienation are positively related to “Always take notes from the board”; the coefficient is statistically significant at the 1 percent level. Forty five percent of the cross-country variation in student alienation is explained by the share of students who always take notes from the board. Working in groups is not associated with alienation.

3.3 Teaching practices and Aggregate Social capital

3.3.1 Teaching practices, Trust and Civic life

This section looks at the broader implications of teaching practices for trust and civic life at the country level. Figure 2 shows the relationship between the country level of trust and the Gap between “Vertical Teaching” and “Horizontal Teaching.” Trust is measured by the standard question from the World Values Survey 2000: “In general do you think you can trust others or one cannot be too careful?” The answer is 1 if the respondent trusts others, and zero otherwise. We calculate the country average level of trust. Vertical and Horizontal teaching measures are taken from TIMSS, as described before, and the Gap is the country level difference between the two. The correlation between the Gap and trust is strongly negative; almost one third of the cross-country variation in trust is explained by the variation in the Gap. Scandinavian countries (with the exception of Finland), and to a lesser extent Anglo-Saxon countries, combine both a fairly high level of trust and teaching practices tilted toward horizontal rather than vertical. In contrast, most Mediterranean (Turkey, France and Greece in the first place) and East European countries are characterized by teaching practices biased toward the vertical and low levels of trust. The big outliers are Japan and Ireland, which tilt toward vertical teaching practices but have high trust.

Table 11 documents the robustness of the relationships between generalized trust and teaching practices by including income per capita, school expenditure per student, and average years of education at the country level. Columns 1-2 show a negative correlation between generalized trust and the shares of students who “always take notes from the board”, “never work in groups”, and the Gap. The coefficients are statistically significant at the 1 percent level. Teaching practices are statistically more significant than national education, a variable usually seen to be the main determinant of trust. The relationship is also economically sizeable. Respectively 33 percent and 32 percent of the cross-country variation in generalized trust is explained by the variation in “Always take notes from the board” and the Gap between Take notes and Work in groups. An increase by one standard deviation in “Always takes notes from the board” is associated with a decline by 5.7 percentage points in generalized trust. Income per capita and average years of schooling are also statistically significant determinants of generalized trust in a cross-section of countries.

Columns 4-6 of Table 11 show that teaching practices are also significantly related to civic life, measured as the percentage of citizens registered in an association in the WVS 2000. In particular, there is a negative and statistically significant (at the 1 percent level) relationship between the share who “always take notes from the board” and association membership. Taken alone, this share explains 48 percent of the cross-country variation in association membership.

Figure 2 – Generalized Trust and the Gap between Vertical and Horizontal Teaching. Source: TIMSS, WVS

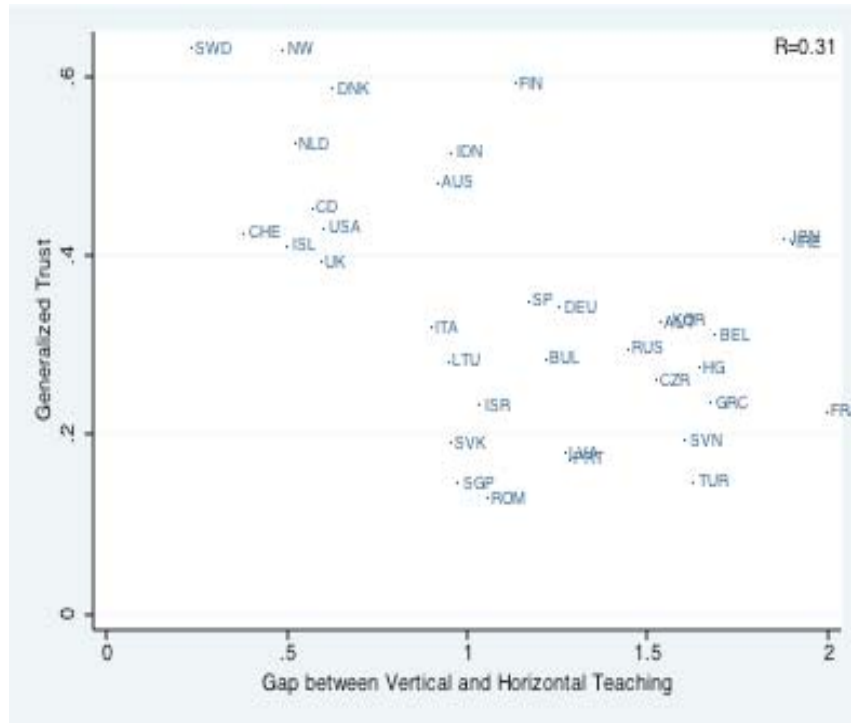


Table 12 documents the effects of teaching practices on attitudes toward officials. One might expect vertical teaching to fuel a sense of subordination of citizens to officials, breeding distrust in politics and the state. In contrast, horizontal teaching might encourage a feeling of belonging to the same community and an expectation of accountability from the official. We investigate this hypothesis by using the International Social Survey Program 2006 devoted to the role of government. The ISSP 2006 covers a large set of countries for which we have data on teaching practices. We use the following related questions: “Most civil servants can be trusted to do what is best for the country”. The answers range from 1 for Strongly Agree, 2 for Agree, 3 for Neither Agree nor Disagree, 4 for Disagree and 5 for Strongly Disagree. The second question is related to the perception of fairness of civil servants: “In your opinion, how often do public officials deal fairly with people like you?”. The answers range from 1 for Almost always, 2 for Often, 3 for Occasionally, 4 for Seldom and 5 for Almost never. We use the country average of the answers to these two questions.

Table 12 shows that the variables trust in civil servants and belief in their fairness are negatively related to the share of students who “always take notes from the board”; both relationships are statistically significant at the 1 percent level. In contrast, horizontal teaching does

not display any significant relationship with attitudes toward civil servants. To interpret the magnitude of the effect, we recode the attitudes toward civil servants. Take the question “In your opinion, how often do public officials deal fairly with people like you?”. We create an indicator of the fairness of civil servants equal to 1 if the answers are “Almost always” and “Often”, and to 0 otherwise. We then use the country average share of this variable as the left hand side variable. All the controls are the same as in Table 12. An increase by ten percentage points in the share of students who always take notes from the board is associated with a fall of 6.7 percentage points in the share of respondents who believe that civil servants treat them fairly.

Columns 7-9 of Table 12 show that vertical teaching is also associated with a more widespread feeling of corruption from the elites. From the ISSP 1996, we use the following question on the perception of corruption of civil servants: “In your opinion, how many public officials are involved in corruption?”. The answers range from 1 for Almost None, 2 for A few, 3 for Quite a lot, and 4 for Almost all. This index of perception of corruption is higher when more students “always take notes from the board” as well as when the Gap is higher. The coefficients are statistically significant at the 1 percent level.

3.3.2 Organization of firms

This section evaluates the consequences of teaching practices for the organization of firms and the quality of labor relations. We assess whether a society emphasizing horizontal teaching also promotes horizontal organization of work in firms. Perhaps citizens who have been trained to cooperate at schools are also more likely to cooperate at work. Conversely, vertical teaching might encourage hierarchical relationships outside of school, and in particular at work. We test this prediction by looking at three cross-country indicators on firm organization.

Figure 3 shows the cross-country relationship between the Gap between Vertical and Horizontal teaching and decentralization of firms. Decentralization is measured using the following question from the Global Competitiveness Report 2009 (GCR): “In your country, how do you assess the willingness to delegate authority to subordinates? 1 = low: top management controls all important decisions; 7 = high: authority is mostly delegated to business unit heads and other lower-level managers”. The GCR is based on a survey given to a representative sample of managers in all the countries for which we have indicators of teaching practices. This indicator of delegation has been found by Bloom and Van Reenen (2010) to be highly correlated with their own cross-country measure of decentralization in firms. Figure 3 shows a strong negative relation between this

indicator of decentralization and the gap between Vertical and Horizontal teaching. Both Anglo-Saxon and Scandinavian firms are much more decentralized than the European ones, and especially the Mediterranean and the East European ones, paralleling the patterns in teaching practices.

Figure 3 – Decentralization of firms

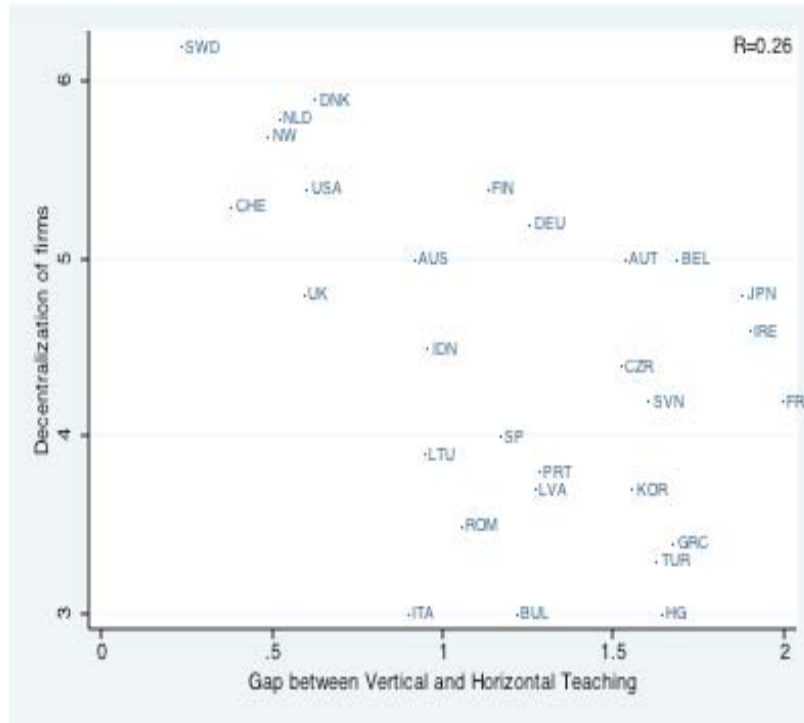


Table 13 – Col. 1-3 confirm that the organization of firms is associated with teaching practices, even with additional controls. Delegation of authority is lower when more students “always take notes from the board” or when the Gap between vertical and horizontal teaching is higher. The coefficients are statistically significant at the 1 or 5 percent. Taken alone, vertical teaching explains a quarter of the cross-country dispersion in the delegation of authority.

Table 13 – Col. 4-6 provide the complementary picture based on worker views on their degree of autonomy in the organization of their daily work. The question is taken from the European Social Survey and reads: “When you think about your work, how much freedom do you have in the organizations of your tasks”. The answer ranges from 1 for no freedom at all to 10 for total freedom. The results show that workplace autonomy is negatively and significantly related to the share who “always take notes from the board” and to the Gap between vertical and horizontal teaching.

We also investigate how these differences in teaching practices relate to the quality of labor

relations. From the GCR 2009, we use the question: «How would you characterize labor-employer relations in your country? 1 = generally confrontational; 7 = generally cooperative.” Since the data come from the GCR, this question captures the point of view of managers and executives.

Figure 4 – Quality of labor relations

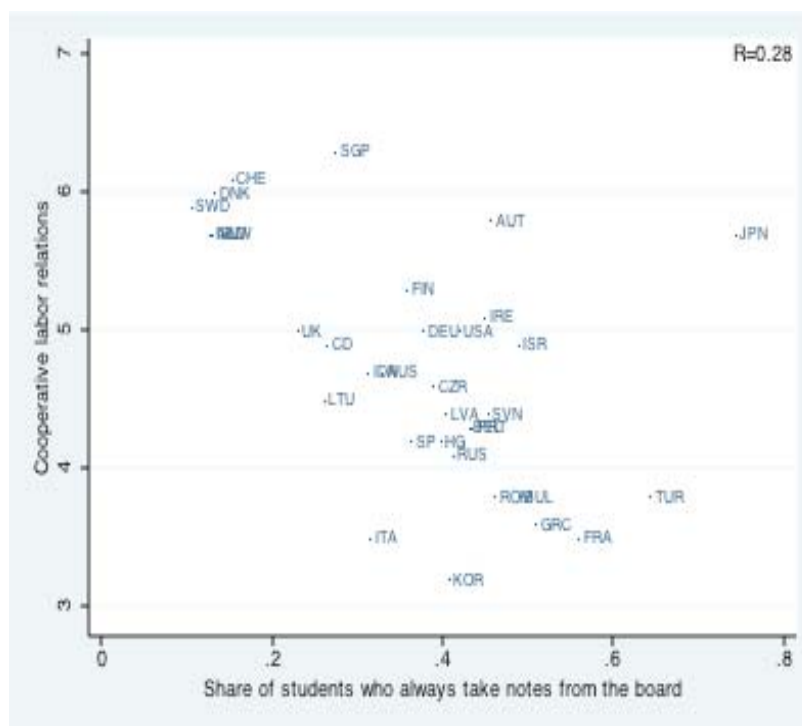


Figure 4 shows that countries in which students always take notes from the board do not have cooperative labor relations. Twenty eight percent of the cross-country variation in the quality of labor relations is explained by vertical teaching. Table 13 tests the robustness of this relationship when we include additional controls. Columns 7-9 show that the quality of labor relations is reduced when vertical teaching dominates. The correlation is the most significant for the Gap between the time spent in vertical and horizontal teaching.

3.3.3 The Quality of Institutions

We conclude this section by looking at the more general consequences of teaching practices. We first explore the relationship between teaching practices and the extent of regulation of the society. One might expect vertical teaching to be associated with a more hierarchical organization of the state. We look at this using two main indicators. The first is government effectiveness, measured as the average of the Kaufmann government effectiveness index between 1998 and 2007 (see

Kaufmann et al., 2008). This measure captures perceptions of the quality of public services, the quality of civil service, and its degree of independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The range of the score is from -2.5 to +2.5, with a higher score indicating greater government effectiveness. The second institutional measure is regulatory intensity, which we measure as the number of steps for starting a new business from Djankov et al. (2002).

Table 14 – Col. 1-3 show that government effectiveness is lower in countries where vertical teaching predominates. The correlation patterns are statistically significant and economically sizeable. Vertical teaching alone can explain 18.3 percent of the cross-country variation in government effectiveness. Table 14 – Col. 4-6 reports the relationship between entry regulation and teaching practices. Regulation is the more stringent in countries where more students “always take notes from the board”; the coefficient is statistically significant at the 5 percent level.

3.4 Social capital and patterns of cooperation

The previous section has shown that teaching practices are highly correlated with student beliefs about cooperation with each other and with teachers. One might wonder which of these is more important in supporting trust and social capital. Following Putnam (1993), most of the literature considers cooperation between equals as the foundation of generalized trust. This paper provides an opportunity to compare the roles of cooperation between equals and cooperation in a hierarchical relationship, as perceived by the students. We use the indicators of cooperation constructed in section 3.2.

Table 15 looks at the relationship between the country level of trust and student beliefs in cooperation. We find that generalized trust is positively related to the perception of cooperation with teachers. The correlation is statistically significant at the 5 percent level and is economically sizeable. Interestingly, the relationship is weaker between belief in cooperation with peers and generalized trust. The picture is the reverse for association membership. Belief in cooperation with teachers does not display any statistically significant relationship with the share of citizens who belong to an association. In contrast, there is a positive and statistically significant relationship between belief in cooperation among peers and association membership.

These results suggest that both aspects of social capital are relevant, but for different results. Generalized trust is more related to the perception that authorities are cooperative or fair. Trust is

lower when these relationships are seen as unfair. Civic life is more related to the ability to cooperate and work with peers. To put it differently, learning to cooperate in groups at schools seems to train people how to cooperate more generally in their life. But this does not mean necessarily that these people trust others. In contrast, the degree of fairness felt in vertical relationships is directly related to generalized trust.

We explore further the roles of beliefs in cooperation with peers and teachers at schools relative to other indicators of cooperation that have been found to be correlated with social capital in the previous literature. La Porta et al. (1997) show that the prevalence of hierarchical religion in a country is negatively correlated with trust and association membership. Aghion et al. (2010) find that civil law versus common law, seen as proxies for different styles of social control of business, are also related to social capital. Column 3 of Table 15 shows that the belief in cooperation with teachers is the only variable related to trust even when we include these additional controls. Column 6 shows that the belief in cooperation with peers remains statistically significant at the 5 percent level as a predictor of association membership. These results suggest that teaching practices at schools are not merely proxies for other institutional factors. Teaching practices matter in their own right for the building of social capital, and might be more important than several other factors.

4. Teaching practices and Cognitive skills

Are teaching practices also related to student cognitive performance? This section addresses this question both at the individual and country level. We use the TIMSS database for the micro estimates (recall that we could not use TIMSS to study beliefs because it does not record them). TIMSS report test scores in mathematics for students in 8th Grade, along with teaching practices and student backgrounds. TIMSS math performance is measured on an international achievement scale with the mean of 500 and the standard deviation of 100. These achievement tests are evidently representative of national cognitive skills and have been endorsed by all the participating countries (see Martin and Kelly 1997). We measure teaching practices using the variables: “Students take notes from the board” and “Students work in groups” from TIMSS. Recall that these variables range from 1 for Never, 2 for Sometimes, 3 for Often, to 4 for All the time. We also consider dummies for measuring the frequency of each teaching practice to detect potential non-monotonic effects.

The regressions control for several student, teacher, and school characteristics. From the student survey, we use information on family background, including parental education and the number of books at home. We also include student age, as well as dummies for whether the student

was born abroad and whether she is a girl. From the teacher survey, we include the teacher's age, gender, highest level of formal education, and years of experience. We also use the size of the classroom in which that teacher teaches that student. From the school principal's survey, we use variables indicating the shortage of instruction materials in the school (equal to 1 for None, 2 for A little, 3 for Some, and 4 for A lot) and the community location of the school (1 for Geographically isolated area, 2 for Village or rural area, 3 for On the outskirts of a city, and 4 for Center of the city).

Table 16 presents the micro estimates. All the regressions control for country fixed effects. Column 1 shows that "Take notes from the board" is statistically significantly negatively related to math performance. However, Column 2 shows the same negative relationship between math test scores and "Students work in groups." The relationships for the two teaching practices are both statistically significant at the 1 percent level. However, the coefficient on "Students work in groups" is lower than that on "Take notes from the board." This evidence suggests that it might be useful to look for non-monotonic effects of teaching practices.

We do so by including in the regressions dummies for each frequency of each teaching practice. We take the frequency "Never" as the reference group. Column 3 shows that taking notes from the board "Sometimes" instead of "Never" is positively related to math performance. However, the relationship between math test scores and taking notes from the board "Often" and "Always" is negative. Column 4 shows that a similar non-monotonic pattern emerges between math performance and the frequency with which "Students work in groups".

The size of the coefficients on teaching practices is quite substantial. Consider the coefficients on the dummies for the frequency of each teaching practice (Columns 3 and 4). Students who work in groups "Sometimes" perform 7.88 test-score points better than students who "Never" work in groups. This effect is of the same order of magnitude as having a teaching with one higher educational degree, the only other teacher characteristic to be statistically significant at the 1 percent level. This effect is comparable to an increase of one and a half steps in the education of the mother or the father. Working in groups "Often", instead of "Never", has a negative but not statistically significant effect on test performance. But students who "Always" work in groups perform 23.82 test score points lower than students who "Never" work in groups. This effect is twice as large as that of being an immigrant. The magnitude of the coefficients on "Taking notes from the board" is smaller. Students who take notes from the board "Sometimes" instead of "Never" do not significantly improve their test scores. Yet students who take notes "Often" or "Always" perform 10.97 and 15.84 points lower than students who "Never" take notes from the board.

We conclude by looking at the aggregate implications of teaching practices for cognitive skills. For the macro estimates, we compute country average tests scores from TIMSS. We also use the information on cognitive tests of 15 year old students provided by PISA 2000 and 2003. From PISA, we also take the country's share of repeaters in secondary schools and the country average value of the PISA index on socio-economic inequality in cognitive scores. This index measures the effect of the socioeconomic background of each student on his cognitive tests. The background includes income and the level of education of the family. The higher is the index, the higher is the role played by the socioeconomic background of the student in his test scores. We average the indices at the country level.

Table 17 presents the OLS estimates of cognitive skills controlling for income per capita and school expenditure. We report the results for the tests score in mathematics from TIMSS 1995. We do not find a statistically significant relationship between test scores and teaching practices. We have checked with PISA cognitive tests, without finding any effects either. Table 17 also shows that the average years of education are negatively related to vertical teaching. This seems to suggest that even though teaching practices do not directly affect cognitive skills at a given grade, they might influence the selection of students into upper grades.

Table 18 documents the effects of teaching practices for the share of repeaters and the index of socioeconomic inequality. It is consistent with the previous results. More vertical teaching is associated with a higher share of repeaters in secondary schools and a higher weight of socioeconomic backgrounds.

5. Conclusion.

We have documented a significant relationship between teaching practices and social capital-supporting beliefs for a sample of about 80,000 students, 7,000 teachers and 4,000 schools from 23 countries. Horizontal teaching practices, such as working in groups, seem to promote the formation of social capital, while vertical teaching practices, such as teachers lecturing, seem to discourage it. We have developed several approaches to suggest that these correlations reflect causal effects, and not omitted variable bias. Overall, it appears that schools, and not just families, work to produce social capital. This is a hopeful conclusion because it suggests the possibility of altering social capital in the community through teaching practices.

We have also shown that, in a cross-section of countries, teaching practices are associated both with beliefs supporting social capital, and several outcomes bearing on the organization of firms

and governments. Although extreme horizontal teaching practices seem associated with inferior test performance, so do extreme vertical teaching practices. From the point of academic achievement, the optimum seems to be in the middle. All this evidence adds up to a fairly strong case for progressive education very much as articulated by Dewey (1943).

Throughout the paper, we have focused on the social capital payoff of progressive education. Yet there is a substantial and growing body of thought that non-cognitive skills, which seem intimately related to social capital, have an economic payoff as well (see, for example, Heckman 2008, Brunello and Schlotter 2010, Oreopoulos and Salvanes 2011). The relationship between teaching practices and economic performance of students is one of many open areas that need to be explored.

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TABLES

Table 1 – Sources of variations in teaching practices across schools: OLS Micro estimates. Source: CES.

VARIABLES	(1)	(2)
	“Students work in groups”	“Teacher lectures”
Student Gender (female)	0.00485 (0.00951)	0.000590 (0.0123)
Father’s education	0.00525 (0.00326)	0.00357 (0.00421)
Mother’s education	0.0125*** (0.00344)	0.000788 (0.00450)
Number of books at home	0.00652* (0.00386)	0.00624 (0.00485)
Immigrant	-0.00886 (0.0220)	-0.0756* (0.0393)
Student Age	-0.0128* (0.00738)	-0.000638 (0.00930)
Teacher gender (female)	0.296*** (0.0292)	-0.172*** (0.0384)
Teacher age	-0.0316 (0.0238)	-0.00928 (0.0288)
Teacher education	0.0147 (0.0169)	-0.000565 (0.0203)
Teacher experience	0.00335 (0.00252)	-0.00390 (0.00306)
Teacher social capital	0.206*** (0.0265)	0.0710** (0.0340)
Class size (ln)	0.0254 (0.0701)	0.203** (0.0788)
Public	-0.0292 (0.0516)	-0.121* (0.0671)
Fraction of students from low socio-economic backgrounds	-0.108 (0.0694)	-0.210** (0.0891)
Country fixed effects	Yes	Yes
Observations	83063	82912
R-squared	0.283	0.153

Robust standard errors in parentheses

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

Table 2 – Student belief in cooperation among students: OLS Micro estimates. Source: CES

VARIABLES	(1)	(2)
	Beliefs in cooperation among students	
Teaching practices		
Students work in groups	0.0120*** (0.00306)	
Teacher lectures		-0.0125*** (0.00261)
Controls		
Student Gender (female)	0.120*** (0.00593)	0.120*** (0.00593)
Father's education	0.00145 (0.00259)	0.00168 (0.00258)
Mother's education	-0.00498* (0.00266)	-0.00497* (0.00266)
Number of books at home	0.00598** (0.00277)	0.00603** (0.00277)
Immigrant	-0.000206 (0.0131)	-0.00132 (0.0131)
Student Age	-0.00502 (0.00447)	-0.00489 (0.00447)
Teacher age	-0.00159 (0.00376)	-0.00266 (0.00375)
Teacher education	-0.00157 (0.00269)	-0.00139 (0.00268)
Teacher experience	0.000523 (0.000398)	0.000555 (0.000398)
Teacher social capital	-0.00343 (0.00387)	-0.00272 (0.00386)
Class size (ln)	-0.0328** (0.0163)	-0.0333** (0.0163)
Public school	0.0343*** (0.0117)	0.0315*** (0.0117)
Country fixed effects	Yes	Yes
Observations	83063	82912
R-squared	0.084	0.084

Robust standard errors in parentheses

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

Table 3 – Student belief in cooperation between students and teachers: OLS Micro estimates. Source: CES

VARIABLES	(1)	(2)
	Belief in cooperation between students and teachers	
Teaching practices		
Students work in groups	0.0235*** (0.00362)	
Teacher lectures		-0.0106*** (0.00312)
Controls		
Student Gender (female)	0.191*** (0.00706)	0.192*** (0.00707)
Father's education	0.0120*** (0.00307)	0.0126*** (0.00307)
Mother's education	-0.00231 (0.00317)	-0.00231 (0.00317)
Number of books at home	0.0280*** (0.00321)	0.0280*** (0.00321)
Immigrant	0.0128 (0.0152)	0.0121 (0.0152)
Student Age	-0.00420 (0.00532)	-0.00447 (0.00533)
Teacher age	0.00958** (0.00455)	0.00770* (0.00455)
Teacher education	-0.00791** (0.00318)	-0.00807** (0.00318)
Teacher experience	-0.00123** (0.000483)	-0.00106** (0.000483)
Teacher social capital	0.00522 (0.00457)	0.0106** (0.00457)
Class size (ln)	-0.0544*** (0.0187)	-0.0539*** (0.0188)
Public school	-0.0349** (0.0140)	-0.0379*** (0.0140)
Country fixed effects	Yes	Yes
Observations	82791	82638
R-squared	0.080	0.080

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.

Table 4 – Student involvement in Associations and Teaching practices. OLS Micro estimates. Source:

CES.

VARIABLES	(1)	(2)
	Association Memberships	
Teaching practices		
Students work in groups	0.0549*** (0.0121)	
Teacher lectures		-0.0134 (0.0105)
Controls		
Student Gender (female)	0.196*** (0.0236)	0.198*** (0.0237)
Father's education	0.0613*** (0.0105)	0.0614*** (0.0105)
Mother's education	0.0916*** (0.0109)	0.0929*** (0.0110)
Number of books at home	0.218*** (0.0110)	0.218*** (0.0110)
Immigrant	-0.0690 (0.0558)	-0.0698 (0.0558)
Student Age	0.00916 (0.0194)	0.00630 (0.0194)
Teacher age	0.0168 (0.0148)	0.0137 (0.0148)
Teacher education	-0.0195* (0.0113)	-0.0189* (0.0113)
Teacher experience	-0.00133 (0.00154)	-0.00110 (0.00154)
Teacher social capital	0.00247 (0.0161)	0.0113 (0.0159)
Class size (ln)	-0.371*** (0.0624)	-0.369*** (0.0628)
Public school	-0.156*** (0.0495)	-0.161*** (0.0495)
Country fixed effects	Yes	Yes
Observations	85019	84865
R-squared	0.163	0.163

Robust standard errors in parentheses

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

Table 5 – Trust and Teaching practices. OLS micro-estimates. Source: CES

VARIABLES	(1)	(2)
		Trust
Teaching practices		
Students work in groups	0.00672** (0.00298)	
Teacher lectures		-0.00143 (0.00261)
Controls		
Student Gender (female)	0.0109* (0.00587)	0.0114* (0.00587)
Father's education	0.00135 (0.00256)	0.00142 (0.00256)
Mother's education	-0.00467* (0.00263)	-0.00470* (0.00263)
Number of books at home	-0.00450* (0.00270)	-0.00444 (0.00271)
Immigrant	-0.0268** (0.0130)	-0.0263** (0.0130)
Student Age	-0.00476 (0.00479)	-0.00445 (0.00480)
Teacher age	0.00282 (0.00374)	0.00207 (0.00374)
Teacher education	-0.00368 (0.00271)	-0.00374 (0.00271)
Teacher experience	9.20e-05 (0.000397)	0.000150 (0.000398)
Teacher social capital	0.00634 (0.00386)	0.00795** (0.00387)
Class size (ln)	-0.0294* (0.0159)	-0.0298* (0.0159)
Public school	0.0338*** (0.0115)	0.0330*** (0.0115)
Country fixed effects	Yes	Yes
Observations	83923	83771
R-squared	0.048	0.048

Robust standard errors in parentheses

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

Table 6 –Socio Economic Family Backgrounds and the relation between Teaching practices and Students Beliefs. OLS Micro Estimates. Source: CES.

VARIABLES	Beliefs in cooperation among students				Beliefs in cooperation with teachers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Share of low socioeconomic backgrounds < National average		Share of low socioeconomic backgrounds > National average		Share of low socioeconomic backgrounds < National average		Share of low socioeconomic backgrounds > National average	
Students work in groups	0.008 (0.006)		0.012** (0.006)		0.014 (0.009)		0.028*** (0.009)	
Teacher Lectures		-0.009* (0.005)		-0.013*** (0.004)		-0.004 (0.005)		-0.019*** (0.005)
Observations	36142	35979	29485	29489	36035	35872	29401	29404
R-squared	0.094	0.094	0.096	0.096	0.071	0.071	0.093	0.093

Additional controls. Student level: age, gender, immigrant, number of books at home, education of the parents. Teacher level: age, gender, education, years of experience, social capital. School level: (ln)-size of the class, public institution. Country fixed effects. Robust standard errors clustered at the student level *** p<0.01, ** p<0.05, * p<0.1

Table 7: Second Stage Estimates for the teaching practice “Students work in groups” – 2SLS Micro estimates. Source: CES.

VARIABLES	(1)	(2)	(3)	(4)
	Beliefs in cooperation with teachers	Beliefs in cooperation among students	Association Membership	Trust
Teacher lectures (IV = Female Teacher)	0.0114 (0.0342)	0.0608*** (0.0180)	-0.00878 (0.0724)	0.00449 (0.0176)
Student gender (female)	0.192*** (0.00793)	0.120*** (0.00593)	0.196*** (0.0236)	0.0109* (0.00587)
Father’s education	0.0122*** (0.00303)	0.00116 (0.00259)	0.0617*** (0.0105)	0.00136 (0.00257)
Mother’s education	-0.00184 (0.00339)	-0.00554** (0.00267)	0.0928*** (0.0110)	-0.00471* (0.00263)
Number of books at home	0.0283*** (0.00353)	0.00560** (0.00277)	0.218*** (0.0110)	-0.00440 (0.00270)
Immigrant	0.0121 (0.0173)	-0.000734 (0.0131)	-0.0695 (0.0558)	-0.0266** (0.0131)
Student Age	-0.00446 (0.00591)	-0.00418 (0.00448)	0.00795 (0.0194)	-0.00465 (0.00480)
Teacher education	-0.00776 (0.00486)	-0.00196 (0.00270)	-0.0194* (0.0113)	-0.00369 (0.00271)
Teacher age	0.00762 (0.00746)	0.00150 (0.00395)	0.0117 (0.0154)	0.00297 (0.00388)
Teacher experience	-0.00103 (0.000779)	0.000235 (0.000414)	-0.000823 (0.00160)	9.10e-05 (0.000410)
Teacher social capital	0.0103 (0.00885)	-0.0113** (0.00467)	0.0125 (0.0191)	0.00640 (0.00463)
Class size (ln)	-0.0513* (0.0282)	-0.0345** (0.0164)	-0.367*** (0.0626)	-0.0295* (0.0159)
Public school	-0.0367 (0.0245)	0.0368*** (0.0117)	-0.159*** (0.0496)	0.0335*** (0.0115)
Country fixed effects	Yes	Yes	Yes	Yes
Observations	82628	82900	84854	83758
R-squared	0.078	0.080	0.163	0.048

Robust standard errors in parentheses

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

Table 8: Second Stage Estimates for the teaching practice “Teacher Lectures”. 2SLS Micro estimates. Source: CES.

VARIABLES	(1) Beliefs in cooperation with teachers	(2) Beliefs in cooperation among students	(3) Association Membership	(4) Trust
Teacher lectures	0.0179	-0.106***	-0.00393	-0.0137
(IV = Female Teacher)	(0.0354)	(0.0302)	(0.121)	(0.0293)
Student gender (female)	0.191***	0.120***	0.198***	0.0115*
	(0.00707)	(0.00596)	(0.0237)	(0.00588)
Father’s education	0.0124***	0.00203	0.0613***	0.00146
	(0.00307)	(0.00260)	(0.0105)	(0.00257)
Mother’s education	-0.00235	-0.00449*	0.0934***	-0.00470*
	(0.00317)	(0.00267)	(0.0110)	(0.00264)
Number of books at home	0.0279***	0.00671**	0.218***	-0.00428
	(0.00323)	(0.00279)	(0.0111)	(0.00271)
Immigrant	0.0135	-0.00764	-0.0692	-0.0269**
	(0.0154)	(0.0134)	(0.0563)	(0.0132)
Student Age	-0.00433	-0.00458	0.00575	-0.00430
	(0.00533)	(0.00449)	(0.0194)	(0.00481)
Teacher education	-0.00807**	-0.00163	-0.0190*	-0.00377
	(0.00318)	(0.00271)	(0.0113)	(0.00271)
Teacher age	0.00783*	-0.00243	0.0125	0.00237
	(0.00455)	(0.00379)	(0.0148)	(0.00374)
Teacher experience	-0.000949*	0.000187	-0.000921	8.94e-05
	(0.000504)	(0.000421)	(0.00162)	(0.000414)
Teacher social capital	0.00761	0.00837*	0.0106	0.00884*
	(0.00569)	(0.00488)	(0.0199)	(0.00482)
Class size (ln)	-0.0588***	-0.0131	-0.369***	-0.0275
	(0.0202)	(0.0175)	(0.0676)	(0.0170)
Public school	-0.0332**	0.0161	-0.160***	0.0308**
	(0.0150)	(0.0128)	(0.0541)	(0.0126)
Country fixed effects	Yes	Yes	Yes	Yes
Observations	82475	82749	84700	83606
R-squared	0.078	0.066	0.163	0.047

Robust standard errors in parentheses

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

Table 9 – “Beliefs in cooperation at schools” – OLS Macro Estimates. Source: PISA, TIMSS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	«Cooperation among students»			« Cooperation with teachers»		
Never work in groups	-.308*** (.105)			-.163*** (.049)		
Always take notes from the board		-.255* (.132)			-.162** (.059)	
Gap between Notes – Group			-.112*** (.037)			-.066*** (.019)
School expenditure	.054 (.080)	.006 (.084)	.047 (.079)	-.003 (.046)	-.020 (.046)	-.004 (.040)
Income per capita	-.026 (.054)	-.007 (.058)	-.029 (.054)	-.004 (.039)	.000 (.030)	-.008 (.026)
Average years of education	-.007 (.011)	-.009 (.012)	-.014 (.011)	-.006 (.006)	-.007 (.008)	-.010 (.007)
Observations	30	30	30	30	30	30
R-squared	0.257	0.132	0.266	0.323	.276	0.382

Table 10 – Student feeling of alienation. OLS Macro estimates. Source: PISA, TIMSS, WVS.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	«Respect Parents» - WVS			«Feeling of alienation at school» - PISA		
Never work in groups	.088 (.120)			.010 (.027)		
Always take notes from the board		.385*** (.115)			.104*** (.017)	
Gap between Notes – Group			.101** (.036)			.024** (.009)
School expenditure	.089 (.062)	.091 (.057)	.080 (.051)	.030* (.017)	.024 (.014)	.021 (.017)
Income per capita	-.117** (.046)	-.112** (.040)	-.109*** (.035)	-.025* (.013)	-.019* (.009)	-.019 (.012)
Average years of education	-.019 (.009)	-.011 (.009)	-.010 (.010)	.000 (.002)	.002 (.001)	.002 (.002)
Observations	31	31	31	29	29	29
R-squared	0.471	0.639	0.583	0.426	0.557	0.368

Table 11 – Teaching practices, Generalized Trust and Association Membership. OLS Macro estimates.
Source: TIMSS, WVS.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	«Generalized Trust » - WVS			« Association Membership » - WVS		
Never work in groups	-.192* (.107)			.001 (.160)		
Always take notes from the board		-.400*** (.133)			-.606*** (.127)	
Gap between Notes – Group			-.120*** (.035)			-.128* (.064)
School expenditure	-.165 (.114)	-.181* (.104)	-.166 (.100)	-.027 (.096)	-.086 (.072)	-.049 (.087)
Income per capita	.150** (.066)	.151** (.062)	.146 (.058)	.098 (.066)	.116** (.044)	.106* (.056)
Average years of education	.031 (.010)	.023** (.008)	.021** (.009)	.068*** (.013)	.049*** (.012)	.052*** (.016)
Observations	31	31	31	27	27	27
R-squared	0.47	0.59	0.57	0.59	0.75	0.67

Table 12 – Teaching practices and Trust in public officials. OLS Macro estimates. Source: ISSP, TIMSS.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Trust in Civil Servants – ISSP			Civil Servants treat citizens fairly - ISSP		
Never work in groups	-.217 (.541)			-.125 (.433)		
Always take notes from the board		-1.361** (.567)			-1.906*** (.420)	
Gap between Notes – Group			-.279 (.253)			-.392* (.215)
School expenditure	.071 (.281)	-.047 (.184)	-.193 (.196)	.255 (.300)	.077 (.183)	.114 (.223)
Income per capita	.103 (.226)	.137 (.142)	.101 (.193)	-.025 (.246)	.013 (.147)	-.036 (.199)
Average years of education	-.003 (.024)	-.035 (.024)	-.030 (.029)	.011 (.044)	-.037 (.034)	-.030 (.055)
Observations	20	20	20	20	20	20
R-squared	0.118	0.423	0.229	0.083	0.556	0.266

Table 12 (continued) – Teaching practices and Trust in public officials. OLS Macro estimates. Source: ISSP, TIMSS.

VARIABLES	(7)	(8)	(9)
	Corruption of civil servants – ISSP 2006		
Never work in groups	.560 (.392)		
Always take notes from the board		1.946*** (.470)	
Gap between Notes – Group			.406*** (.123)
School expenditure	.241 (.230)	.505** (.235)	.224 (.176)
Income per capita	-.553** (.210)	-.637*** (.180)	-.535*** (.161)
Average years of education	-.074 (.052)	-.033 (.046)	-.036 (.056)
Observations	22	22	22
R-squared	0.596	0.771	0.684

Table 13 – Teaching practices and Organization of firms. OLS Macro estimates. Source: ESS, GCR, TIMSS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Delegation of authority – GCR 2009			Freedom in daily work organization – ESS 2008		
Never work in groups	-.930 (.693)			-.881 (.596)		
Always take notes from the board		-2.247*** (.629)			-3.101*** (.993)	
Gap between Notes – Group			-.633** (.253)			-.621** (.273)
School expenditure	-1.092* (.565)	-1.180** (.492)	-1.123** (.478)	-.097 (1.155)	-.181 (.782)	-.161 (.956)
Income per capita	1.104*** (.334)	1.114*** (.285)	1.112*** (.270)	.999 (.656)	1.014** (.425)	.966* (.543)
Average years of education	.192** (.079)	.152* (.081)	.136 (.091)	.140 (.085)	.004 (.066)	.070 (.069)
Observations	28	28	28	18	18	18
R-squared	0.62	0.71	0.69	0.74	0.84	0.80

Table 13 (continued) – Teaching practices and Organization of firms. OLS Macro estimates. Source GCR, TIMSS

VARIABLES	(7)	(8)	(9)
	Quality of labor relations – GCR 2009		
Never work in group	-1.394* (.812)		
Always take notes from the board		-2.094* (1.040)	
Gap between Notes – Group			-.665** (.274)
School expenditure	-.853* (.460)	-.995* (.496)	-.908* (.451)
Income per capita	.868*** (.282)	.895** (.325)	.869*** (.284)
Average years of education	.128* (.074)	.100 (.079)	.080 (.083)
Observations	30	30	30
R-squared	0.482	0.541	0.582

Table 14 –Teaching practices and Institutions. OLS Macro estimates. Source: TIMSS.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Government Effectiveness			Regulation of entry		
Never work in groups	-.193 (.405)			.457 (.526)		
Always take notes from the board		-1.293*** (.317)			.843** (.371)	
Gap between Notes – Group			-.303** (.146)			.207 (.155)
School expenditure	.023 (.314)	.026 (.229)	.045 (.262)	.010 (.237)	.065 (.180)	.040 (.204)
Income per capita	.666*** (.191)	.645*** (.130)	.649*** (.157)	-.074 (.189)	-.094 (.152)	-.086 (.170)
Average years of education	.001 (.039)	-.029 (.039)	-.029 (.048)	-.125*** (.028)	-.108*** (.031)	-.109*** (.032)
Observations	30	30	30	30	30	30
R-squared	0.851	0.900	0.870	0.378	0.418	0.385

Table 15 – Cooperation among students and with teachers. OLS Macro estimates. Source: PISA, WVS.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Generalized Trust – WVS			Association Memberships – WVS		
Cooperation with teachers		0.601** (0.219)	.595** (.221)		.176 (.407)	
Cooperation among students	.197* (.112)			.437* (.216)		.628** (.287)
School expenditure	-.277** (.107)	-.239*** (.071)	-.179** (.077)	-.092 (.121)	-.027 (.142)	-.219 (.153)
Income per capita	.222*** (.062)	.197*** (.047)	.145** (.052)	.128 (.081)	.091 (.095)	.213* (.106)
Average years of education	.032*** (.010)	.030 (.011)	.010 (.017)	.066*** (.012)	.067*** (.013)	.044** (.020)
Hierarchical religion			-.062 (.065)			.026 (.116)
Common Law			.017 (.059)			-.068 (.102)
German Law			.027 (.057)			.137* (.068)
Scandinavian Law			.153* (.076)			.201 (.139)
Observations	30	30	30	26	26	26
R-squared	0.550	0.614	0.761	0.658	0.597	0.801

Table 16 – Cognitive Skills and Teaching practices. OLS Micro estimates. Source TIMSS.

VARIABLES	(1)	(2)	(3)	(4)
	Cognitive Test Scores			
Teaching practices				
Students take note from the board	-7.140*** (1.034)			
Students work in groups		-5.774*** (1.076)		
Take notes – Never			Reference	
Take notes – Sometime			1.344 (3.717)	
Take notes – Often			-10.98*** (4.006)	
Take notes – Always			-15.84*** (4.332)	
Work in groups – Never				Reference
Work in groups – Sometime				7.883*** (1.888)
Work in groups – Often				-1.313 (3.073)
Work in groups – Always				-23.82*** (3.066)
Student controls				
Girl	-5.064*** (1.423)	-4.879*** (1.421)	-5.160*** (1.417)	-5.359*** (1.394)
Age	3.415*** (0.978)	3.544*** (0.966)	3.493*** (0.978)	3.421*** (0.950)
Born abroad	-11.97*** (3.156)	-11.69*** (3.095)	-11.86*** (3.149)	-11.20*** (3.006)
Number of books at home	14.71*** (0.636)	14.66*** (0.632)	14.68*** (0.637)	14.61*** (0.626)
Mother's education	4.680*** (0.510)	4.863*** (0.520)	4.667*** (0.509)	4.829*** (0.504)
Father's education	5.656*** (0.570)	5.447*** (0.566)	5.638*** (0.570)	5.493*** (0.568)
Teacher and School controls				
Teacher's age	2.658 (3.143)	2.894 (3.183)	2.640 (3.135)	3.005 (3.167)
Teacher's gender (female)	8.814** (4.129)	8.975** (4.019)	8.858** (4.128)	8.624** (3.874)
Teacher's education	6.160*** (2.026)	6.542*** (1.900)	6.129*** (2.024)	6.898*** (1.819)
Teacher's experience	0.222 (0.309)	0.228 (0.308)	0.229 (0.311)	0.241 (0.306)
Class size (ln)	3.958 (6.725)	5.191 (6.198)	4.090 (6.800)	5.580 (6.067)
Shortage of instruction materials	-3.418* (1.777)	-3.488** (1.690)	-3.438* (1.780)	-3.399** (1.623)
Urban area	5.376*** (1.724)	4.582*** (1.716)	5.380*** (1.731)	4.959*** (1.671)
Observations	108506	108506	108506	108506
R-squared	0.274	0.271	0.275	0.278

Table 17 – Cognitive skills and Average years of education. OLS Macro estimates. Source: TIMSS.

VARIABLES	(1) Cognitive skills in grade 8 th - TIMSS 1995	(2)	(3)	(4)	(5)	(6)
Never work in groups	.741 (.120)			-1.253 (1.756)		
Always take notes from the board		1.387 (1.187)			-4.133** (1.760)	
Gap between Notes and Group			.326 (.224)			-1.271*** (.406)
School expenditure	.533 (.376)	.510 (.302)	.534 (.328)	1.907 (1.400)	.889 (.544)	1.963 (1.262)
Income per capita	-.311 (.254)	-.278 (.220)	-.109 (.035)	-.523 (.930)	-.748 (.797)	-.706 (.828)
Observations	28	28	28	30	30	30
R-squared	0.068	0.102	0.088	0.281	0.557	0.372

Table 18 – Share of repeaters and Socioeconomic inequality. OLS Macro estimates. Source: PISA, TIMSS.

VARIABLES	(1) Share of repeaters	(2)	(3)	(4)	(5)	(6)
Never work in groups	.177 (.142)			.254 (.200)		
Always take notes from the board		.324** (.148)			.573*** (.200)	
Gap between Notes and Group			.084* (.044)			.128** (.058)
School expenditure	.099 (.072)	.096 (.065)	.102 (.065)	-.115 (.125)	.183 (.140)	.196 (.147)
Income per capita	-.051 (.047)	-.032 (.037)	-.042 (.040)	-.115 (.125)	-.079 (.115)	-.100 (.122)
Observations	28	28	28	28	28	28
R-squared	0.197	0.293	0.274	0.138	0.247	0.194

Appendix

Appendix A – Descriptive statistics

Table A1- Definition and descriptive statistics for the database “Civic Education Study”.

Variable definitions	Mean	Standard deviation
<i>“Teacher lectures”</i> : This variable derives from the question: “In your class, how often does the teacher lecture?” The answer equals 1 for “Never”, 2 for “Sometimes”, 3 for “Often” and 4 for “Very often”. Source: Teacher survey	2.338	.868
<i>“Students work in groups”</i> : This variable derives from the question: “In your class, how often do the students work in groups?” The answer equals 1 for “Never”, 2 for “Sometimes”, 3 for “Often” and 4 for “Very often”. Source: Teacher survey	2.557	.787
<i>Teacher’s age</i> . Variable with six categories: 1=under 25 years old, 2= 25-29 years old, 3= 30-39 years old, 4=40-49 years old, 5=50-59 years old, 6=60 years old or more. Source: Teacher survey	3.667	1.109
<i>Teacher’s education</i> . This variable measures the highest level of former education, in 5 categories. Source: Teacher survey	3.076	1.235
<i>Teacher’s experience</i> : number of years of teaching altogether. Source: Teacher survey	16.712	10.599
<i>Teacher’s gender</i> : dummy variable equal 1 if female, and 0 for male. Source Teacher survey	.668	.470
<i>Teacher’s trust</i> : This variable is the average of questions 1) “How much confidence do you have in the political system?”, 2) “How much confidence do you have in elections?”, 3) “How much confidence do you have in the judicial system?”, 4) “How much confidence do you have in immigration?”, 5) “How much confidence do you have in social welfare?”, 6) “How much confidence do you have in labor unions?”. The answers equal 1 for “Not at all”, 2 for “Little confidence”, 3 for “Confident” and 4 for “Very confident”. Source: Teacher survey	2.615	.574
<i>Teacher’s beliefs in cooperation</i> : This variable is the average of the questions 1) “Students learn at school to understand people” and 2) “Students learn at school is to cooperate in groups”. The answers range from 1 for “Strongly disagree” to 4 for “Strongly agree”. Source: Teacher survey.	3.074	.484
<i>Size of the class</i> : number of students per classroom. Source: School Survey	25.66	6.48

Table A1 (continued)

Variables – Student characteristics	Means	Standard deviation
<i>Student age</i> : number of years. Source: Student survey	14.166	.704
<i>Student gender</i> : dummy equal 1 if female, and 0 otherwise. Source: Student survey		
<i>Immigrant</i> : dummy variable equal 1 if the student is born abroad, 0 otherwise. Source: Student survey	.066	.247
<i>Grade</i> : variable equal 8 for the 8 th grade, and 9 for the 9 th grade. Only one grade per country. Source: student survey	8.337	.473
<i>Mother's education</i> : This variable derives from the question "How far in school did your mother go?" The answer equals 1=No elementary education, 2=Finish elementary school, 3=high school, 4=Completed high school, 5= Some higher technical education, 6=Some college, university, 7=Graduate education. Source: Student survey	4.156	1.578
<i>Father's education</i> : This variable derives from the question "How far in school did your father go?" The answer equals =No elementary education, 2=Finish elementary school, 3=high school, 4=Completed high school, 5= Some higher technical education, 6=Some college, university, 7=Graduate education. Source: Student survey	4.183	1.563
<i>Number of books at home</i> : measured by the question "How many books are there in your home?". The answer has 7 categories: 1=None, 2=1-10 books, 3=11-50 books, 4=51-100 books, 5=101-200 books, 6=more than 200 books. Source: Student survey	4.287	1.350
<i>"Student's belief in cooperation among students"</i> . This variable is the average of the questions: 1) "The goal of education is to understand people with different ideas" and 2) "The goal of education is to learn how to cooperate in groups with other students". The answers ranges from 1 for Strongly Disagree, 2 for Disagree, 3 for Agree and 4 for Strongly Agree. Source: student survey	3.136	.556
<i>"Student's belief in cooperation between students and teacher"</i> . This variable is the average of the questions: 1) "Are students encouraged to make up their own opinion?", 2)"Do teacher respect your opinion?", 3)" Do you feel free to express opinions in class?", 4)"Do you feel free to openly disagree with the teacher?". The answers range from 1 for strongly disagree to 4 for strongly agree. Source: student survey.	3.040	.660
<i>"Student association membership"</i> . This variable is the sum of the 15 items related to an association membership: "Have you ever participated to: A student council? A youth organization? A school newspaper? An environmental organization? A U.N or UNESCO Club? A Student exchange program? A Human Rights Organization? A Group Conducting Activities? A Charity Collecting ? A boy or girl scout group? A cultural association? A computer club? An art, drama or music association? A Sport Organization? An association supported by a religious group?".. For each association, the answer equal 1 if the respondent participates to it and 0 otherwise. Source: student survey.	2.955	2.331
<i>"Student's level of trust"</i> . This variable is the average of the questions "How much confidence do you have in: 1) Justice? 2) The Police?,3) Education institutions/Schools? , 4) The people who live in this country?". The answers equal 1 for "Not at all", 2 for "Little confidence", 3 for "Confident" and 4 for "Very confident". Source: Student survey	2.824	.537

Table A2 – Samples of schools and teaching practices. Source: CES.

Country	Number of schools	Number of students	Lecture		Group	
			Mean	Std	Mean	Std
AUS	142	3330	2.199	.677	2.745	.725
BGR	139	2674	2.687	.823	2.273	.751
CHE	155	3065	1.564	.680	2.510	.760
CHL	180	5688	2.601	.727	3.248	.687
CYP	61	3106	2.688	.768	2.256	.698
CZE	148	3607	2.400	.843	2.196	.685
DEU	169	3700	1.591	.675	2.260	.660
DNK	173	3124	2.073	.626	2.961	.677
EST	122	2927	2.365	.793	2.343	.737
FIN	146	2780	2.375	.801	2.445	.621
GRC	139	3391	2.656	.901	2.043	.712
HUN	146	3167	2.338	.872	2.239	.680
ITA	172	3808	2.942	.726	2.382	.754
LTU	169	3494	2.127	.830	2.519	.701
LVA	130	2572	2.359	.784	2.395	.683
NOR	150	3258	2.478	.628	2.665	.690
POL	178	3347	2.798	.811	3.071	.788
PRT	148	3228	2.450	.731	2.270	.528
ROM	146	2985	3.185	.832	2.231	.795
RUS	184	2120	2.968	.700	2.120	.653
SVK	145	3456	1.977	.884	2.364	.651
SVN	149	3068	1.941	.845	2.701	.754
SWE	138	3071	2.276	.574	2.663	.747
UK	128	3039	1.864	.762	2.475	.751
USA	124	2811	2.428	.817	2.720	.788