Teaching strategies and differential effectiveness across learning contexts: Evidence from PISA 2012

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Abstract

Modern educational theories emphasise effectiveness enhancing factors at the classroom level and differential effectiveness for sub-groups of students and across different learning contexts. Theoretical developments, however, are generally based on national evidence and have been criticised for lacking cross-cultural perspectives. This study used PISA 2012 data to examine how subject-specific teaching strategies related to mathematics performance of students across education systems whilst considering curvilinear associations and interactions with the socio-economic and instructional context. The results provide consistent evidence of a positive curvilinear relationship between cognitive activation strategies and mathematics performance. The association tends to be stronger in schools with a positive disciplinary climate and for students from advantaged socio-economic backgrounds, but not in every education system. Teacher-directed strategies are positively related to mathematics performance, but the association tends to become negative for high levels of teacher-directed instruction. Associations of student-oriented strategies with mathematics performance are inconsistent. The cross-national evidence contributes to the knowledge base of educational theory.

Keywords: teaching strategies, educational effectiveness, PISA.

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Current advances in educational effectiveness theory advocate the study of classroom level processes with analytical models that recognise the multidimensionality of classroom, school and system characteristics and the complexities of education settings (BLINDED). Teachers' behaviours and what happens in the classroom are considered the most significant effectiveness factors for explaining academic outcomes and metacognitive skills of students. Particularly, effectiveness models differentiate between teaching strategies (e.g. teacher-centred, student-oriented, cognitively activating teaching strategies) and the instructional context (e.g. classroom management and climate and teacher-student relations) at the classroom level. Effectiveness factors at the school, student, and education system level are relevant to the extent that they moderate what happens in the classroom.

Theoretical models of educational effectiveness such as the dynamic model take into account the complex nature of education settings by considering non-linear relationships between effectiveness factors and student learning outcomes as well as same-level and cross-level interactions using advanced statistical techniques (BLINDED; Scheerens, 2013). It is thus acknowledged that effectiveness factors do not necessarily work equally for different groups of students, schools, and education systems and that their effectiveness may vary depending on the composition of other factors at the same and at different levels (BLINDED).

Despite significant methodological and theoretical advances, educational effectiveness research has been criticised for its lack of cross-cultural perspectives (Reynolds 2000). Most research has been conducted within countries, but evidence shows that some effectiveness factors may work in some countries and not in others. Further, national studies might not be able to capture curvilinear relations and significant interactions with effectiveness factors due to restricted amount of variability in the data. It is argued that cross-national studies are required in order to evaluate the validity of effectiveness models across

cultures and explain how policies affect student outcomes in different settings (Creemers, 2006).

International assessment data provides a great source of variation within and between countries for studying the effects of classroom and school factors and their differential effectiveness across different learning contexts (Creemers, 2006). The Programme for International Student Assessment (PISA) is likely the most influential international assessment on educational debates and policies (Baird, Isaacs, Johnson, Stobart, Yu et al., 2011; Wiseman, 2010). And although PISA does not sample classes or collects observational data to measure instructional characteristics, results provide consistent evidence of the effectiveness of an instructional context characterised by a positive disciplinary climate (OECD, 2013b). Significant same-level interactions are also reported for school factors. For example, teacher participation in leadership has been shown to be related to a better perception of school climate (Sarafidou & Chatziioannidis, 2013) and in PISA, too, there is evidence of a positive interaction between school autonomy and teacher participation. This interaction suggests that the positive effects of school autonomy on mathematics performance are stronger in schools with greater teacher participation in school management.

Further, PISA introduced in 2012 a number of questions in the student questionnaire related to teaching strategies and the instructional context in the mathematics classroom that align well with the conceptual framework of educational effectiveness research (OECD 2013a). Drawing on these data, this study examined the association between mathematics performance and teaching strategies as well as possible interactions with the classroom instructional context and the socio-economic context of students across education systems.

Educational effectiveness research and the dynamic model

What today is comprehensively called educational effectiveness research (EER) captures a range of research areas from different waves and strands (BLINDED; Reynolds, et al., 2014).

It represents an integration of the fields of school effectiveness (school organisation and educational policy) (Teddlie & Reynolds, 2000) and research aimed at the classroom level (teacher behaviour, instruction methods, and curriculum analyses) (BLINDED; Opdenakker & Van Damme, 2006; Stronge, Ward, & Grant, 2011). With a proceeding awareness of contextual impacts on learning processes, approaches were elaborated that viewed effectiveness as a multilevel phenomenon integrating cross-level relationships in the theoretical models (Scheerens, 2013). This development promoted the blending of the former approaches (BLINDED; Scheerens, 1997) to what has commonly been called educational effectiveness. It has moreover yielded in the dynamic model of educational effectiveness as elaborated by BLINDED, which refers to the student-, classroom-, school-, and context level to explain educational outcomes.

The dynamic model of educational effectiveness regards schooling as a dynamic and ongoing process (BLINDED; Slater & Teddlie, 1992). Educational institutions are viewed as active actors that adapt to changing contexts in order to remain effective (Doolaard, 2002). Over time, they identify weaknesses and take actions towards the improvement of structures, practices, and policies (BLINDED). Effectiveness factors are not captured as unidimensional constructs, but are rather measured along five dimensions: frequency, focus, stage, quality, and differentiation (BLINDED).

Further, the dynamic model considers curvilinear relations and interaction effects on student achievement. For example, the relationships of student achievement with frequency of classroom evaluations and with teacher knowledge are expected to be curvilinear if initial positive effects reduce at higher levels, that is, when too many evaluations reduce teaching time and very sophisticated knowledge might be harder to communicate. Likewise, class practices and school policies could interact with or vary in their effectiveness for the characteristics of students and educational contexts. For example, students from

dissadvantaged backgrounds are more likely to be influenced by teachers' expectations (Trouilloud, Sarrazin, Bressoux, & Bois, 2006). Interaction effects moreover refer to relations between effectiveness factors acting at the same level. Rather than a single factor, it might be a grouping of factors that promotes effective teaching (BLINDED; Reynolds, Sammons, De Fraine, Van Damme, Townsend et al., 2014). With that, the dynamic model recognises the complexities of educational settings, where effectiveness factors may work differently at different levels and may work for some students, schools, and education systems, but not for others (Sammons, 2009). That is, what works in education does not work in all contexts and levels.

The multilevel structure is an essential characteristic of the dynamic model of educational effectiveness. Within this structure, most emphasis is given to the classroom-level as previous studies have shown that the classroom level is more significant in explaining educational outcomes than the school or context level (BLINDED; Teddlie & Reynolds, 2000, Yair, 1997). School factors are considered only to the extent that they affect classroom processes (BLINDED; Opdenakker & van Damme, 2007; Stevens 2005). Within the classroom level, special attention is given to observable teacher behaviours and actions as opposed to other less dynamic factors, like teacher knowledge or teacher qualifications. The actions and behaviours of teachers are viewed as shaping the quality of teaching and, in turn, student learning. Teacher behaviour and actions at the classroom level include teaching strategies as well as teacher efforts to create an orderly and positive learning environment (instructional context) (BLINDED). This distinction is also made in research particularly focused on instruction which differentiates between "teaching practices and global factors of classroom process quality" (Decristan et al.,in press) and "enacted regimes and quality of enactment" (Raudenbush, 2008). Based on research into teaching quality this distinction has also been incorporated in the PISA 2012 questionnaire framework, particularly for the study

of mathematics instruction (Klieme et al., 2013). This study aims to examine the interactions between teaching strategies and characteristics of the instructional context. It therewith follows aims of EER to investigate the effectiveness of a combination of teacher behaviour factors and actions, an area that is under-investigated in the field (Reynolds et al. 2014).

Teaching strategies

Teaching strategies encompass teaching practices that orient mainly along traditional or more constructivist paradigms of teaching and learning (Cobern et al. 2010; van de Grift, 2014). Traditional approaches are related to direct teaching (or teacher-directed instruction), where the teacher is assumed to control the learning process and add to students' knowledge by routine drill and practice (Li, 1999; Schunk, 2008). There is an explicit connection of new content with students' prior knowledge, criteria for learning goals are explicit and set transparently, content is often presented in small structural units and its acquisition is repeatedly checked (van de Grift, 2014; Hattie, 2009; Opdenakker & van Damme, 2006).

Teaching strategies based on constructivist ideas promote students' active engagement in learning and in the construction of knowledge (Terhart, 2003; Schunk, 2008). The teacher's role is to support the processes that are necessary for the student to construct knowledge. Student-oriented instruction for example promotes activating and cooperative learning environments trough discussions between students and the teacher, as well as among students themselves. Activities are also adapted to the needs of different students in the classroom and emphasise student-initiated and student-regulated learning activities (Cornelius-White, 2007; Opdenakker & van Damme, 2006; van de Grift, 2014). Related to the constructivist paradigm and student-oriented teaching, cognitive activation has been discussed in particular within contexts of mathematics and science instruction. A cognitively activating lesson supports conceptual understanding and connections between facts, procedures, ideas and representations and engages students in higher-level thinking

(Lipowsky et al., 2009). It does so by challenging students' beliefs, setting tasks without clear answers and promoting students to explain, evaluate, and compare their strategies and solutions (Baumert et al., 2010; Lipowsky et al., 2009). Empirical evidence suggests that cognitively activating teaching is positively related to student achievement in mathematics (Klieme et al, 2001; Baumert et al., 2010; Lipowsky et al., 2009). Whether or not traditional or constructivist teaching approaches are more effective and if they benefit all groups of students equally, is strongly debated in the literature (Desimone et al., 2005; Lee & Luykx, 2005; Tomlinson, Brighton, Hertberg et al., 2003) and in reality, instruction represents a mixture of both, varying as a function of the knowledge domain and the context and skills that students need to learn (Lipowsky, et al., 2009; Rupley, Blair, & Nichols, 2009; Zuzovsky, 2013). This argument is partly supported by the results of recent meta-analyses of teacher effectiveness studies (e.g., BLINDED; Seidel & Shavelson, 2007) which reveal that an integrated approach to effective teaching should be adopted.

In fact, the vast body of literature on effective teaching practices provides empirical evidence of positive effects for both, strategies related to traditional and constructivist paradigms. For example, a well-structured lesson, that applies explanations as well as presentations, contains teaching modelling, examinations of students' understandings and an evaluation of clearly set criteria has been found to be positively related to language learning and mathematics achievement (Connor et al., 2004; Hattie, 2009; Pearson & Gallagher, 1983; Ryder et al., 2006), and comparable effects have been documented for science (Cobern et al., 2010).

Likewise, effectiveness of teaching is also increased when strategies related to the constructivist paradigm are applied (Cornelius-White, 2007) and instruction is characterised by differentiation and adaptive instruction, cooperative and domain-specific learning, the development of challenging situations, experiments (e.g. in science), students being

confronted with open-ended questions and having to explain their answers in language instruction and mathematics (Hattie, 2009; Houtveen et al., 1999; Opdenakker & van Damme, 2006; Seidel & Shavelson, 2007) and science (Odom, Stoddard, & LaNasa, 2007).

It is not possible to obtain unconfounded evidence of the superiority of a single teaching strategy because a typical lesson will encompass, and likely require, teaching practices that relate to both more traditional and constructivist paradigms to varying degrees. Since teaching strategies are complementary, their effectiveness cannot be judged in isolation. Indeed, studies typically assess teaching practices on scales and levels and therefore rule out the existence of a pure or absolute approach. Further, mixed evidence reported in the literature and the theoretical underpinnings of educational effectiveness research suggest that effects may depend not only on student, classroom and school characteristics but also on characteristics of the instructional context.

Differential effectiveness of teaching strategies

Different teaching strategies are not equally beneficial for all students, and their effectiveness may vary for the characteristics of students, schools, education systems and the instructional context of the classroom (Campbell et al., 2003; BLINDED).

Interactions with the instructional context of classrooms

The learning environment, i.e. the instructional context of the classroom affects teaching and learning practices (BLINDED; Opdenakker & van Damme, 2006, 2007; Brand et al., 2003). Some of the most important aspects of the instructional context discussed in the literature are classroom management, disciplinary climate, and teacher-student relations (BLINDED; Decristan et al., in press; Klieme, 2013).

Teachers with effective classroom management skills create an orderly and quiet work environment and apply effective control strategies to maintain it in order to increase the time allocated to teaching and learning by e.g. minimising transition times between lessons,

ensuring an orderly lesson progress, and maximising opportunities to learn (Klieme et al., 2001; Lipowsky, et al., 2009; Opdenakker & van Damme, 2006; van de Grift, 2014). There is evidence that an effective classroom management is not only related to higher academic outcomes of students (Opdenakker & van Damme, 2006; Lipowsky et al., 2009; Seidel & Shavelson, 2007; Wang et al., 1993) but it is also a necessary condition for cognitively activating teaching strategies and moderates the relationship between students' interest and their academic outcomes (Baumert, et al., 2009; Klieme et al., 2001; Lipowsky, et al., 2009).

A positive disciplinary climate is characterised by fewer disruption and a safe and orderly atmosphere in the classroom that allows students and teachers to focus more on content-related tasks (Lipowsky, et al., 2009). The disciplinary climate has been shown to be positively associated with students' academic outcomes (Cornelius-White, 2007) because it is a prerequisite for effective teaching practices (BLINDED; Harris & Chrispeels, 2006). This association seems to be stronger for more disadvantaged student groups (Palardy, 2008) and to promote student-oriented instruction (Matsumura, et al., 2008).

Positive teacher-student relations are those based on trust, in which students feel their voices are heard and the teacher recognises individual differences based on his/her student-centred beliefs (Cornelius-White, 2007; Opdenakker & van Damme, 2006). They are conceptually described as aspects of a positive learning environment, i.e. instructional context (BLINDED; OECD 2013a). Positive relationships support students' motivation to engage with the content and their positive effect on academic outcomes has for example been documented by Brand et al. (2003), Cornelius-White (2007) and Matsumura et al. (2008).

Interactions with student characteristics

The effectiveness of teaching strategies appears also to vary for the ability level and family background of students. Gao (2014) suggests that low, medium and high ability students respond differently towards teaching strategies based on traditional or constructivist

paradigms in different countries. There is evidence that low ability students and those from lower socioeconomic backgrounds profit more from teacher-directed instructional practices than high ability students and those from advantaged socioeconomic backgrounds (Connor, Morrison, & Katch, 2004; van der Werf, 2006; BLINDED). It is reasoned that these students often lack necessary levels of motivation as well as self-regulatory and higher-order thinking skills that enable cognitive engagement with the subject contents which is initiated through student-oriented teaching practices (Connor et al. 2004; Gao, 2014; Pintrich & de Groot, 1990) or that they simply lack sufficiently high enough prior knowledge and experience to allow them to build upon (Kirschner, Sweller & Clark, 2006).

Interactions with country characteristics

Teaching and learning is not culturally independent (Fuller & Clarke, 1994). Whilst international studies such as PIRLS, TIMSS and TALIS provide evidence for the variation in teaching strategies across different countries (Mullis, Martin & Foy, 2012; Mullis, Martin, Foy & Drucker, 2012; OECD, 2014a), only few studies systematically examine, whether they are similarly associated with achievement across a range of different countries.

Results suggest that teacher-directed strategies are more profoundly related with science achievement in low- and medium achieving countries whilst the effects of student-oriented strategies and highly demanding modes of instruction (cognitive activation strategies) are stronger in medium- and high-achieving countries (Zuzovsky, 2013). Hattie (2009) also found that effects of teacher-directed instruction are higher for reading than for mathematics.

Desimone and colleagues (2005) found mixed evidence for the association between class average achievement and the use of teaching strategies related to constructivist paradigms, that is, positive and negative effects in different countries. Also, different types of

classroom assessment practices vary in their relationship with achievement across England, the Unites States, Canada and New Zealand (Hao & Johnson, 2013).

Research questions

The outlined conceptual framework points towards interactions and curvilinear relationships of teachings strategies with student characteristics. Moreover, the effects of teachings strategies on student performance seem to interact with the instructional context. With the data at hand we will take on a more comprehensive view and investigate curvilinear associations with teachings strategies as well as interactions with the instructional contexts and student socioeconomic characteristics. We have moreover reported that teaching will most likely be a mixture of teaching strategies, rather than just one. But the evaluation of those effects has so far neglected to take this composition into account and many teaching strategies are evaluated in isolation.

The multilevel paradigm of the dynamic model of educational effectiveness further suggests the relevance of a cross-national comparison of the associations between teaching strategies, instructional and socioeconomic contexts and their interactions. We will thus examine whether these factors and their association with performance are comparable across countries.

In particular we investigate the following research questions:

1. What is the relationship between teachings strategies (teacher-directed instruction, student-oriented instruction and cognitive activation) and mathematics performance of students? Is there evidence of curvilinear associations?
2. Does the relationship between teaching strategies and mathematics performance vary for characteristics of the instructional context (classroom management, disciplinary climate, teacher-student relations?

3. Do associations with teaching strategies vary for the student socio-economic status (SES)?

Data

Data from PISA 2012 were used in this study. The analytic sample included 62 education systems after removing Albania due to missing data on socioeconomic characteristics of students and Liechtenstein due to the small sample size for evaluating main and interaction associations. The analytic sample is restricted to students with non-missing observations in independent variables. Sample sizes for the analytic sample are reported by education system in Table A1 (see Appendix A).

The dependent variable was mathematics performance (MATH). It was scaled to have a mean of 500 and a standard deviation of 100 across Organisation for Economic Co-operation and Development (OECD) countries in PISA 2003 (OECD, 2014a). PISA scales derived from student responses were used as independent and control variables.

Independent variables

Teaching strategies scales introduced in 2012 (i.e., COGACT, TCHBEHSO, TCHBEHTD) and instructional context scales (i.e., CLSMAN, DISCLIMA, STUDREL.M) were considered as independent variables. Thereby COGACT and TCHBEHSO represent teaching strategies based on constructivist paradigms and TCHBEHTD represents teaching strategies based on traditional paradigms of teaching and learning. Original names of scales from the PISA database are preserved with the extension .M denoting school averages.

Teacher-directed instruction scale (TCHBEHTD). It was constructed using students' reports on the frequency (every lesson, most lessons, some lessons, never or hardly ever) with which, in mathematics lessons, the teacher sets clear goals for student learning; the teacher asks students to present their thinking or reasoning at some length; the teacher asks

questions to check whether students understood what was taught; and the teacher tells students what they have to learn.

Student-oriented instruction scale (TCHBEHSO). It was constructed using students' reports on the frequency (every lesson, most lessons, some lessons, never or hardly ever) with which, in mathematics lessons, the teacher gives different work to classmates who have difficulties learning and/or to those who can advance faster; the teacher assigns projects that require at least one week to complete; the teacher has students work in small groups to come up with a joint solution to a problem or task; and the teacher asks students to help plan classroom activities or topics.

Cognitive activation scale (COGACT). It was constructed using student responses of how often (always or almost always, often, sometimes, never or rarely) a series of situations happened with the mathematics teacher that taught them their last mathematics class: the teacher asks questions that make students reflect on the problem; the teacher gives problems that require students to think for an extended time; the teacher asks students to decide, on their own, procedures for solving complex problems; the teacher presents problems in different contexts so that students know whether they have understood the concepts; the teacher helps students to learn from mistakes they have made; the teacher asks students to explain how they solved a problem; the teacher presents problems that require students to apply what they have learned in new contexts; and the teacher gives problems that can be solved in different ways. The scale was borrowed from Baumert, Blum, Brunner, Dubberke, Jordan et al. (2009).

Classroom management scale (CLSMAN). It was constructed using students' reports on agreement (strongly agree to strongly disagree) with the following statements about their last mathematics teacher: my teacher gets students to listen to him or her; my

teacher keeps the class orderly; my teacher starts lessons on time; and the teacher has to wait a long time for students to quieten down.

Disciplinary climate (DISCLIMA). Students described the frequency with which interruptions occur in current mathematics lessons. This included how often (never, in some, in most, in all mathematics lessons) students: don't listen to what the teacher says; there is noise and disorder; the teacher has to wait a long time for students to quieten down; students cannot work well; and students don't start working for a long time after the lesson begins.

School average scale of teacher-student relations (STUDREL.M). Students were asked to indicate whether and to what extent they agree (strongly agree to strongly disagree) with several statements regarding their relationships with teachers at school, including whether they get along with their teachers, whether teachers are interested in their personal well-being, whether teachers take the student seriously, whether teachers are a source of support if the student needs extra help, and whether teachers treat the student fairly. As the question was not subject-specific, responses were averaged within the school to reflect teacher-student relations in general.

Control variables

The index of economic, social and cultural status (SES). PISA considers three dimensions for SES: home possessions, parental education, and parental occupational status. The home possessions scale is measured with family wealth possessions, cultural possessions, and home educational resources items as well as the books at home variable (fewer than or equal to 25 books, 26-100 books, 101-500 books, more than 500 books). Parental occupation is measured by the highest score in the international socio-economic index of occupational status (ISEI; Ganzeboom, 2010) of either parent. Parental education is measured by the highest number of years of schooling of either parent. The three variables are summarised into a single SES score using principal component analysis.

School average index of SES (SES.M). It is the school average of SES.

Appendix A and B describe the data by education system. Table A1 and Table A2 present descriptive statistics (i.e., means, standard deviations, and associated standard errors) and correlation matrices for the variables included in the analysis. Table A3 reports variance inflation factor statistics for multicollinearity analysis of independent and control variables included in regression models. Appendix B presents density distributions of independent variables.

PISA scales entered as independent variables in regression models were developed with a one-parameter partial credit model well suited for the analysis of Likert-type response data. Variables were scaled to have a mean of zero and a standard deviation of one across OECD countries. PISA evaluated internal consistency of scales with Cronbach's alpha. Cross-national validity of constructs was evaluated by checking the reliability of scales across countries and by looking at the consistency of correlations between certain scales that were expected to be conceptually related. Teaching strategies and instructional context items were administered randomly to two-thirds of the sample through rotation of the student questionnaire. As a result, around 33% of the data in independent variables is missing by design. Overall, between 33% and 48% of the data across countries is missing (see Table A1). That is, the proportion of missing due to non-response is rather small. More details on the scaling methodology and construct validation can be found in the PISA 2012 Technical Report (OECD, 2014a).

Analytical strategy

Analyses were conducted using regression techniques and visualisation tools from the R package BLINDED (BLINDED). The BLINDED function was used to estimate regressions by education systems whilst handling plausible values and replicate weights. The BLINDED function produced figures of estimated coefficients and standard errors from regression

results. Regression analysis was performed within education systems for external validity of estimates and to avoid cross-cultural comparability bias in independent and control variables, for example, average values in COGACT are much higher in Qatar and Peru than in Korea and Finland and it is not clear if this is for substantive reasons (see Table A1).

The general model specification evaluated the association with teachings strategies and the instructional context whilst controlling for the student and school SES:

$$MATH_{ijk} = \alpha_0 + \alpha_1 SES_{ijk} + \alpha_2 SES.M_{jk} + \alpha_3 COGACT_{ijk} + \alpha_4 TCHBEHSO_{ijk} + \alpha_5 TCHBEHTD_{ijk} + \alpha_6 CLSMAN_{ijk} + \alpha_7 DISCLIMA_{ijk} + \alpha_8 STUDREL.M_{jk} + \varepsilon_{ijk} \quad ...(1)$$

Subscripts *i*, *j*, and *k* represented students, schools, and education systems, respectively. Independent variables were entered in the model in blocks to evaluate the stability of estimates and curvilinear associations at different stages. Results are presented in Appendix C. First, MATH was regressed against independent variables of teachings strategies and instructional context separately in bivariate regressions (see Table C1). Secondly, curvilinear associations of independent variables were evaluated by adding a quadratic term (e.g., COGACT, $COGACT^2$) in separate models without control variables (see Table C2). Thirdly, independent variables were included in combination including (see Table C3) and excluding quadratic terms (see Table C4). Finally, the full model specification of Equation (1) including significant quadratic terms and control variables was estimated (see Table C5). Because SES was left uncentred, associations with SES and SES.M capture the within school association with SES and the association with school SES after controlling for the student SES association.

Interactions with the student SES and the instructional context were evaluated in a second model specification:

$$MATH_{ijk} = \alpha_0 + \alpha_1 SES.M_{jk} + \alpha_m (COGACT_{ijk} + TCHBEHSO_{ijk} + TCHBEHTD_{ijk}) \times (SES_{ijk} + CLSMAN_{jk} + DISCLIMA_{jk} + STUDREL.M_{jk}) + \varepsilon_{ijk} \quad ...(2)$$

For simplicity, models include only interactions with linear terms and α_m represents a vector with *m* estimated parameters for main and interaction effects. Regression estimates of equation (2) are reported in Table C6.

Results

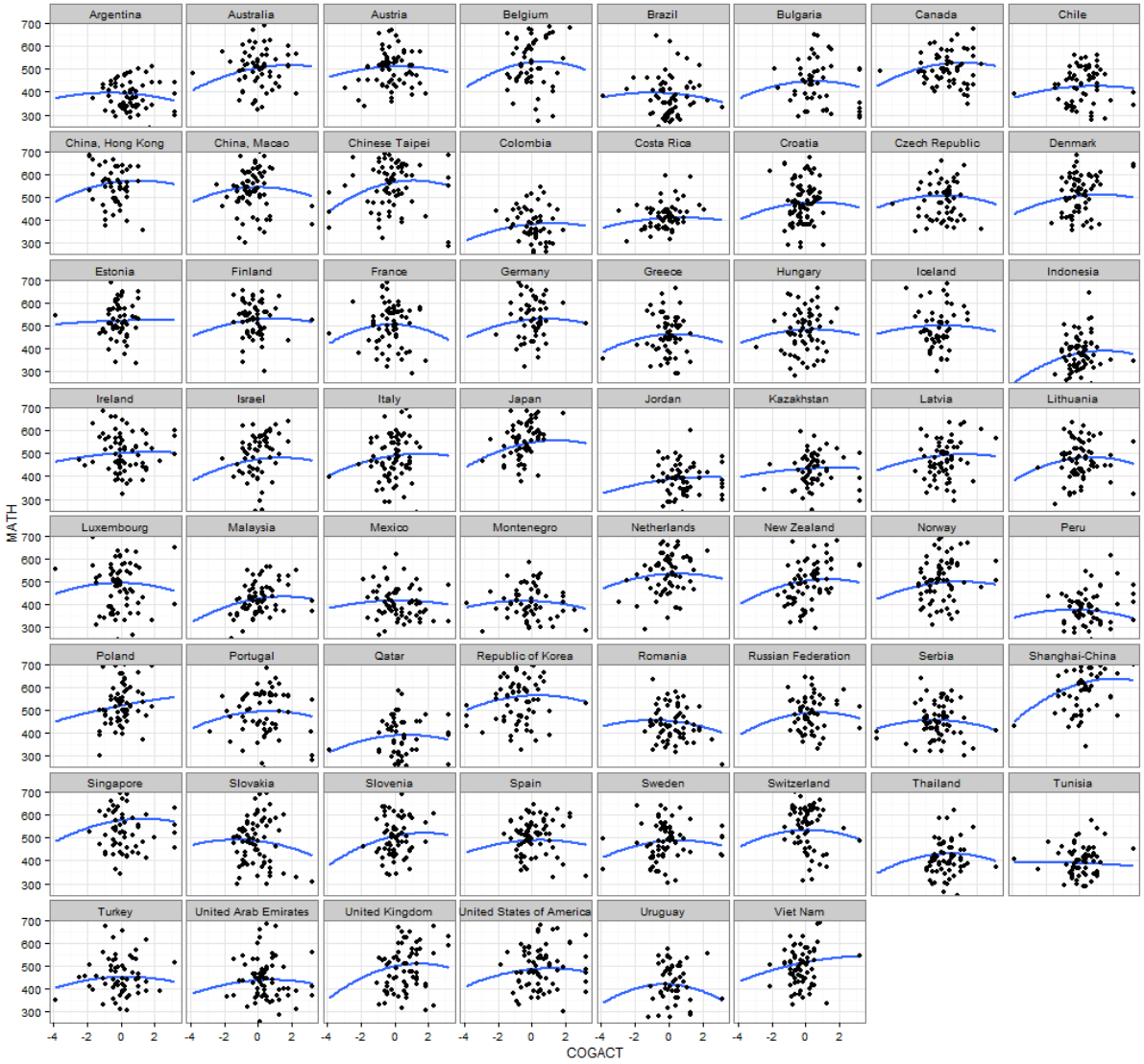
We first examined the association between teaching strategies and mathematics performance (RQ1). Table C1 in Appendix C reports model estimates of bivariate regressions of mathematics performance on teachings strategies and the instructional context variables. In total five bivariate regression models were estimated, one for each independent variable. Teacher-directed instruction (TCHBEHTD) was negatively associated with mathematics performance in 34 education systems and positively in 8, and student-oriented teachings strategy (TCHBEHSO) was negatively associated with mathematics in all of the 62 education systems investigated. The association of cognitive activation (COGACT) with mathematics performance was positive in 27 education systems and negative in 6 education systems. For the instructional context variables we found a positive association with disciplinary climate (DISCLIMA) in 61 education systems and a positive association with classroom management (CLSMAN) in 47 systems. Teacher student relations were positively related to mathematics performance in 16 systems and negatively in 22 systems.

We then evaluated curvilinear associations with independent variables by adding a quadratic term to bi-variate regressions (RQ1). Again, five regression models were estimated, one for each independent variable and its squared term. Results are reported in Table C2. A quadratic term introduces the idea of diminishing returns and refers to how increments in an outcome variable start progressively to decrease as the input factor increases. A negative coefficient of the quadratic term on one of the teachings strategy variables would then indicate that an initially positive association decreases or even becomes negative with increasing frequency with which the strategy is employed by the teacher. Visually this will be

reflected in a concave-shaped association between mathematics performance and teaching strategy.

Quadratic terms of COGACT were negative and significant in the majority of systems (55) and non-significant in 7 education systems. Figure 1 depicts for each education system the curvilinear association between COGACT on the horizontal axis and mathematics performance on the vertical axis. One hundred data points were selected randomly with inclusion probability proportional to sampling weights. The curvilinear line was obtained from a regression of MATH on COGACT and its squared term for the student population in each education system. As can be seen, mathematics performance tends to improve for higher levels of cognitive activation but at a decreasing rate or even with negative associations for very high frequencies of cognitively activation activities. In other words, for students who report the most frequent use of cognitively activating activities from their teachers, the initially positive association of this strategy stagnates or becomes even negatively associated with performance. Negative and non-significant associations between mathematics performance and cognitive activation in the bivariate regressions presented in Table C1 consequently underestimated its positive association. Curvilinear plots similar to Figure 1 for associations with independent variables are presented in Figures D1-D5 (see Appendix D).

Figure 1. Curvilinear association with cognitive activation



Note. Regression lines estimated for regressions of MATH on COGACT and $COGACT^2$. Data points (100 in each system) were selected randomly with inclusion probability proportional to sampling weights.

Results are similar for teacher-directed instruction (see Table C2 and Figure D1) where the association with mathematics performance is positive at fewer frequencies, decreases when teacher-directed instruction is employed more often and ultimately becomes negative at higher frequencies. Again, in the great majority of systems there is a positive side of teacher-directed instruction that is underestimated if guided solely by linear associations. The quadratic term of the student-oriented instruction scale is also negative in the majority of

education systems (see Table C2). However, unlike associations with cognitive activation and teacher-directed instruction, model estimates produce a decisively negative association with student-oriented instruction across education systems (see Figure D2, Appendix D). And although the quadratic term is negative in the majority of systems, the association is only slightly curvilinear and consistently negative across the observed range of the TCHBEHSO scale (see Figure D2). Curvilinear associations with instructional context scales did not produce consistent associations across education systems (see Table C2 and Figures D3-D5). Subsequent models do not include curvilinear associations with the instructional context.

Table C3 presents estimated coefficients for a single regression model of mathematics performance on all three teaching strategy scales along with quadratic terms entered in combination. The linear term of COGACT was positive and statistically significant in all education systems but one, providing even stronger evidence of a positive association with mathematics performance than in previous regressions that omitted associations with the teacher-directed and student-oriented scales (see Tables C1 and C2). Controlling for differences in teacher-directed and student-oriented strategies, student who report higher frequencies of cognitively activating activities tend to have higher mathematics performance. Statistically, TCHBEHSO and TCHBEHTD acted as negative confounders suppressing the association with COGACT. Support for negative omitted variable bias in COGACT coefficients can be found in correlation matrices presented in Table A2. Across education systems, correlations with cognitive activation were positive for teacher-directed and student-oriented instruction, but correlations with mathematics performance were negative for student-orientation, tended also to be negative, albeit smaller, for teacher-directed instruction, and were near zero for cognitive activation. As a result, the bivariate association between mathematics and COAGCT (see Tables A2 and C1) captured negative associations with TCHBEHSO and TCHBEHTD as well as positive associations with COAGCT. When

TCHBEHTD and TCHBEHSO are added to the equation, remaining variation in mathematics was actually more positively and consistently associated with mathematics (see Table C3). We have shown that this is not a result of multicollinearity. Variance inflation factor (VIF) statistics measure the degree of multicollinearity when independent variables are included in combination. VIF statistics are presented in Table A3 and are within acceptable ranges (VIF < 4). Even if we exclude quadratic terms from Table C3 (see Table C4), the association with cognitive activation increased compared to the bivariate model (see Table C1). Further, in unreported analysis (available on request) we have found consistent evidence that residuals of mathematics regressions against TCHBEHSO and TCHBEHTD are more positively associated with COGACT than mathematics and COGACT in bivariate regressions.

Likewise, in some education systems the association of mathematics with teacher directed-instruction became more negative once positive bias introduced by the association between mathematics and cognitive activation is removed (see Tables C3 and C4). Accounting for differences in the use of cognitive activation and student-oriented instruction, teacher-directed instruction was negatively associated with performance in 18 systems (e.g., Switzerland, Norway, Columbia, Peru and the Russian Federation). There was still, however, a positive side of the association (see Table C3) between teacher-directed instruction and mathematics in many systems and in 17 systems the average association was positive (e.g., Australia, Canada, Indonesia, Jordan, Kazakhstan, Qatar, Singapore, and the United States of America). Coefficients of the student-oriented instruction remained negative when teachings strategy scales were included in combination (see Table C3).

The results of the full general model specification including all independent and control variables are reported in Table C5. SES and SES.M coefficients were positive and statistically significant in practically all education systems. Associations with teaching strategy scales are fairly stable even after accounting for individual and school level

differences in socioeconomic background. Disciplinary climate had a consistent positive association with mathematics performance in all systems but the Swedish, even after accounting for differences in socioeconomic background of students and schools. But the initially positive association of classroom management with performance (see Table C1) reduced once levels of disciplinary climate are accounted for. The two aspects of the instructional context have a medium to high correlation in all countries (see Table A2) and it can be argued that a classroom characterised by high levels of discipline requires less management. Therefore the initial positive association of classroom management in the bivariate regression is captured by disciplinary climate in the multivariate model. Classroom management coefficients are unstable, positive and negative across education systems but sample sizes are relatively large and coefficients are very small. On average, models explained 31% of achievement differences in mathematics performance across education systems. R-squared values ranged from 0.13 in Macao (China) to 0.50 in Hungary.

Subsequently, we evaluated interactions of teaching strategy scales with instructional context scales and the student SES (RQ 2 and RQ3). Interactions and main effects were entered in combination in a single model specification, Equation (2). Results are presented in Table 6 in three parts, first the interactions with COGACT, secondly the interactions with TCHBEHTD, and thirdly the interactions with TCHBEHSO. Although not reported in the Table C6, models control for main effects of independent and control variables. Figure 2 displays selected interaction effects for COGACTxDISCLIMA, TCHBEHTDxDISCLIMA, and TCHBEHTDxSES. The horizontal axis presents interaction coefficients and the vertical axis the education systems. Regression estimates of interaction coefficients are presented alongside 95% confidence intervals.

Figure 2: Significant interactions with teaching strategies

In general, interactions of students' socioeconomic background and instructional contexts with teaching strategies were not significant in the majority of education systems. However, the interaction between cognitive activation and disciplinary climate (COGACTxDISCLIMA) was positive and statistically significant in 17 education systems: Australia, Belgium, Costa Rica, Croatia, Czech Republic, Greece, Israel, Italy, Latvia, Lithuania, Malaysia, Mexico, Republic of Korea, Romania, Serbia, Sweden, and United Arab Emirates. In those systems, the association of cognitive activation with mathematics performance increases for higher levels of disciplinary climate. Likewise disciplinary climate interacted positively with teacher-directed instruction in 7 education systems: Argentina, Bulgaria, Germany, Ireland, Jordan, Portugal, and Qatar.

The interaction of cognitive activation and SES (COGACTxSES) was positive in 8 education systems: Brazil, Colombia, Costa Rica, Hungary, Japan, Kazakhstan, Turkey, and

United Arab Emirates. In those systems the association of cognitive activation with mathematics performance is higher for students from more affluent families. The interaction of teacher-directed instruction and SES (TCHBEHTDxSES) was negative in five systems (i.e., Brazil, Colombia, Kazakhstan, Peru, and the United Kingdom). That is, the association between mathematics performance and teacher-directed instruction was more positive for students from disadvantaged backgrounds. But there was also evidence of a positive TCHBEHTDxSES interaction in Uruguay and Ireland.

Discussion

This paper used data from PISA 2012 to examine teaching strategies in the mathematics classroom and how they related to mathematics performance of students across education systems. The focus on the classroom level, curvilinear associations, and interactions with the instructional context aligns well with current models of educational effectiveness. Interactions between teaching strategies and family SES of students are particularly relevant for the debate over equity in education. The domain-specific teaching strategy data is adequately situated in the context of the mathematics major assessment domain in 2012. The international sample provides a great source of variation to study main associations and interactions (Creemers, 2006).

Cognitive activation strategies were positively and consistently related to mathematics performance across education systems. Students who reported their mathematics teachers asked questions that made them reflect on problems, asked students to decide the procedures for solving complex problems, presented problems in different contexts, helped them to learn from mistakes they had made, asked them to explain how they solved a problem, and presented problems that demanded to apply what they have learned in new contexts, tended to perform better in mathematics irrespective of the socio-economic characteristics of their families and schools. The positive association with cognitive activation was curvilinear.

Increasing use of cognitive activation strategies was related to higher performance in mathematics but the association decreased as the use of these strategies increased. For a very high frequency of cognitive activation strategies there was almost no association with mathematics performance or even the association became negative.

Further, there was evidence of a positive interaction between cognitive activation and the disciplinary climate in the mathematics classroom. The association of mathematics performance with cognitive activation was stronger in classes where students reported that they listened to what the teacher says, there was no noise and disorder, the teacher did not have to wait a long time for students to quieten down, and generally students were able to work well. There was also evidence of a positive interaction of teaching strategies and the student SES in some systems. Particularly, cognitive activation strategies appeared to work better for higher SES students than for lower SES students and teacher-directed instruction worked less well for high SES students than for lower SES students. But evidence for these interactions was not consistent across education systems.

In systems where interactions of cognitive activation and SES were significant results may suggest that high SES students possess higher levels of motivation, self-regulatory and higher-order thinking skills that allow them to react and engage more effectively with cognitively activating tasks (Connor et al. 2004; Gao, 2014; Pintrich & de Groot, 1990; Kunter, Baumert, Blum, Klusmann, Kraus & Neubrand, 2013). These meta-cognitive skills are sometimes found to be less well-developed among low SES students (e.g. Cassidy, 2000; Miech, Esses & Goldsmith, 2001; Schunk, Pintrich & Meece, 2010). If guided by this assumption, teaching approaches that foster meta-cognitive skills of students may contribute to improve the effectiveness of cognitive activation strategies among low SES students.

Lower frequency of teacher-directed instruction tended to be positively related to mathematics performance but the relationship became negative at higher levels. We have

argued that an overemphasis of one teaching strategy is likely to neglect the fact that teaching requires varying practices depending in part on the context, knowledge and skills that students need to learn. The curvilinear associations for cognitive activation and teacher directed instruction seem to support this argument. These findings seem to be in line with the results of a recent meta-analysis of teacher effectiveness studies which reveals that an integrated approach to effective teaching should be adopted (BLINDED). Moreover, there was an interaction between teacher-directed instruction and the family SES, but only in some systems. For example, in Brazil, Colombia, Kazakhstan, Peru, and the United Kingdom teacher-directed instruction seemed to be particularly effective for lower SES students, whereas in Ireland and Uruguay it appeared to be more effective for higher SES students. Interactions with SES, however, were not consistent across education systems and therefore the equity dimension of findings should be interpreted with caution and results should not be easily generalised.

Student-oriented instruction was negatively related to mathematics performance in every education system. Further, unreported analysis showed that none of the constituent items of the student oriented instruction scale was positively related to mathematics performance in any education system. The consistency of evidence across education systems is striking and at odds with our expectations. The theory anticipates that student-oriented instruction will promote student's motivation and thereby learning outcomes indirectly (Guthrie & Wigfield, 2000). Consistently we have found a positive association between student-oriented strategies and student's motivation and self-concept in mathematics in unreported analysis with these data. There might be thus an indirect positive association on mathematics performance through affective student characteristics, however, it is not clear how the direct negative association between student-orientation and mathematics performance can be explained.

It is possible that the use of extreme constructivist practices negatively affect the performance of students. In fact the data indicated a non-linear association between student-oriented instruction and mathematics performance, with the association being positive at very low levels of student orientation then reducing and ultimately becoming negative at higher levels. The positive slope side of the curve, however, was at very low levels of student orientation not observed in the data (see Figure D2). Another possible explanation is endogeneity due to the cross-sectional design. Namely, that the direction of causation is not from student-oriented instruction to mathematics performance but the opposite: teachers tend to use student-oriented practices as a result of low performance of students because it tends to be promoted in the educational literature as a better alternative to teacher-directed strategies (Terhart, 2003). Still another explanation is that limited variation in the student-oriented scale at lower levels in many education systems (see Figure B4) prevents us from capturing positive associations with math performance. Even another explanation is that the student orientation scale did not validly assess or fully reflect the concept of student orientation according to the dynamic model of educational effectiveness which refers to the extent that teachers help students identify the reasons for which specific learning tasks or objectives take place in their classroom.

Overall, the results suggest a complex picture of education systems and of the effectiveness of teachings strategies across learning contexts. In accordance with the dynamic model of educational effectiveness, our results suggest that what works, does not work equally for everyone and across different levels. Some teaching strategies work in some school and systemic contexts and for some student populations, but not for others. Moreover, as postulated in previous sections, the effectiveness of some teaching strategies depends on characteristics of the instructional context. Trends advocating more constructivist approaches undifferentiated therefore neglect that there are different versions of human relations and that

teaching and learning function in according to different preferences across cultures (Fuller & Clarke, 1994). It seems worthwhile exploring teachings strategies more closely for different regions. Moreover, inasmuch as in reality instruction represents a mixture of teaching strategies, the expectation to distinguish between positive and negative effects of student-oriented and teacher-directed practices unambiguously, seems misguided.

Limitations and further research

The PISA study design imposes important limitations for the study of teaching strategies. One is the absence of classroom level in the PISA sampling design. As a result, within-school variation in student responses on teaching strategies confounds differences between classrooms and student perceptions. Within countries, most variation in teaching strategies occurred within schools with intra-class correlation coefficients ranging between 5 to 12% for the different scales and education systems. Given the amount of within-school variation, it was preferred not to aggregate the data on teaching strategies at the school level. And yet, unreported results with the aggregated school data pointed to similar overall findings. SES and the index of teacher-student relations were aggregated at the school level from data observed for students sampled within the school, not the entire student population in the school. As a result, aggregated school measures are affected by sampling error which is not accounted for in this study.

Further research could investigate the consequences of not accounting for sampling error on reported estimates of associations with school aggregated variables (e.g. Lüdtke, Marsh, Robitzsch, & Trautwein, 2011). Further research could also consider classroom-level data from the Trends in International Mathematics and Science Study (TIMSS) or possible combinations of PISA and the Teaching and Learning International Study (TALIS) to study effectiveness of teachings strategies more broadly. The data from TIMSS, however, has not

proven successful at identifying effective teachings strategies (O'Dwyer, Wang, & Shields, 2015).

A general limitation of international large-scale assessments is the lack of classroom observational data and pre-test measures that would perhaps allow for a deeper inquiry into the types of teaching strategies and interactions that can promote student learning. Measurement of teaching strategies is based on student ratings. Students are actively involved in their own learning and their perceptions are usually less reliable and valid than judgements of independent observers. Studies with independent classroom observers are, however, costly and generally not available in large-scale assessment studies. Further, research provides support for the validity of teaching scales based on student ratings. It is claimed that instructional practices are relevant only when perceived by students and that students are exposed to a variety of teachers and teaching experiences in different subjects over many lessons, and are generally able to distinguish between different models of teaching (De Jong & Westerhof, 2001; Fraser, 1995; Scherer & Gustafsson, 2015). Thus, they could be regarded as expert raters, particularly in secondary schooling where student ratings tend to be more reliable.

The cross-sectional data prevents us from establishing the order of causation in observed associations. We have, for example, found a consistent negative association between mathematics performance and student-oriented instruction that may be well due to the cross-sectional design. Whenever possible, researchers could combine PISA with national assessment datasets containing prior student performance measures to evaluate whether associations with student-oriented strategies change once prior performance is controlled. Analyses with data from future PISA cycles could evaluate whether student-oriented instruction for specific subject areas are also negatively related to student performance in reading and science literacy. Further research may also investigate the effectiveness of

combinations of teaching strategies in a latent profile approach (Lankes & Carstensen, 2007). Such an approach is able to capture the use of different strategies by one individual teacher and may better pay credit to the argument that teaching is most likely a mixture of strategies based on traditional and constructivist paradigms.

Another limitation is related to the cross-cultural comparability of PISA scales. It is not clear that scales can be compared across countries. Proper measurement invariance analysis was not carried out, but the PISA technical report provides benchmarks for judging the reliability of scales across countries (OECD, 2014a). The reliability of the cognitive activation index and the disciplinary climate index was relatively high and invariant across countries. However, the reliability of the teacher-directed instruction index and the classroom management index was lower. Also, previous research points to lack of cross-cultural validity of socio-economic constructs in PISA (BLINDED). Because there is no support for measurement invariance in these scales comparisons of model estimates and effect sizes across countries have been avoided. Cross-cultural validity imposes a limitation to the comparability of results and represents a great challenge for survey development of international assessments.

Yet another limitation is that, whilst our work is mainly informed by the dynamic model of educational effectiveness, the literature on instructional approaches and the PISA 2012 mathematics questionnaire framework, we are restricted to overlap between PISA data and the theory and are not able to test the dynamic model in its full extent, for example, considering explicitly all the different teaching factors (e.g., orientation, structuring, questioning, teaching modelling, applications, management of time, teacher role in making classroom a learning environment, and assessment) and especially the measurement of each factor in terms of different dimensions (i.e., frequency, focus, stage, quality, and differentiation) (BLINDED) in order to collect data on both the quantitative and qualitative

characteristics of these factors. A related limitation is that PISA's conceptual framework is inspired by theories produced in developed nations and further adapted to these contexts. Thus, by design we lack information on what could work in developing nations. Further research could study the effectiveness of classroom-level factors with international assessment data from other contexts, for example using the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ) and the Latin American Laboratory for Assessment of the Quality of Education (LLECE).

Finally, another limitation is missing data. PISA 2012 adopted a rotated design for the student questionnaire whereby teaching strategies and the instructional context questions were not administered to the total sample of students but to two-third of students randomly assigned to questionnaire forms including these questions (OECD, 2014a). Further, the sampling design did not cover 15-year-olds out of school. Students who drop-out, for example, are not covered by the sampling design and are likely a non-random and significant proportion of the 15-years-olds population at this school stage, particularly in developing nations. For the target sample, missing data due to partial non-response was handled with IRT techniques employed for scale development. Overall, the majority of the data was missing by design and a small proportion of the data was missing due to non-response. Sample sizes are large even after considering rotation of the student questionnaire (see Table A1), which can be assumed not to introduce bias in estimates for 15-year-olds in school (OECD, 2014a). Nevertheless, missing data may introduce bias in estimates and constraints the generalisability of findings.

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Appendix A

Table A1. Descriptive statistics for the variables in the analytic sample

Education system		MATH				ESCS				ESCS.M				COGACT			
	n	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.
Argentina	3592	393.07	(3.56)	74.05	(1.52)	-0.70	(0.05)	1.11	(0.03)	-0.70	(0.04)	0.67	(0.04)	0.35	(0.03)	1.05	(0.02)
Australia	9153	505.55	(1.66)	94.24	(1.21)	0.25	(0.01)	0.79	(0.01)	0.23	(0.01)	0.42	(0.01)	0.14	(0.02)	1.07	(0.01)
Austria	3067	509.01	(2.67)	90.85	(1.90)	0.08	(0.03)	0.85	(0.02)	0.10	(0.02)	0.47	(0.02)	-0.10	(0.02)	0.90	(0.02)
Belgium	5299	524.06	(2.21)	96.42	(1.30)	0.18	(0.02)	0.89	(0.01)	0.18	(0.02)	0.47	(0.02)	-0.19	(0.02)	0.97	(0.02)
Brazil	11797	392.22	(1.97)	76.65	(1.79)	-1.17	(0.02)	1.18	(0.02)	-1.19	(0.02)	0.77	(0.02)	0.06	(0.02)	1.08	(0.02)
Bulgaria	3268	443.75	(3.76)	91.87	(2.09)	-0.26	(0.04)	1.04	(0.03)	-0.26	(0.04)	0.70	(0.04)	0.54	(0.03)	1.13	(0.03)
Canada	13753	521.37	(2.03)	87.33	(0.88)	0.41	(0.02)	0.86	(0.01)	0.41	(0.02)	0.39	(0.01)	0.32	(0.02)	1.06	(0.01)
Chile	4456	423.65	(3.17)	80.39	(1.48)	-0.58	(0.04)	1.13	(0.02)	-0.58	(0.04)	0.83	(0.03)	0.22	(0.02)	0.98	(0.02)
China, Hong Kong	2990	563.90	(3.27)	94.87	(1.96)	-0.79	(0.05)	0.97	(0.02)	-0.79	(0.05)	0.57	(0.04)	-0.20	(0.02)	0.93	(0.02)
China, Macao	3500	540.38	(1.39)	91.84	(1.10)	-0.89	(0.01)	0.86	(0.01)	-0.88	(0.01)	0.45	(0.00)	-0.22	(0.02)	0.87	(0.02)
Chinese Taipei	3981	560.41	(3.27)	114.23	(2.01)	-0.40	(0.03)	0.83	(0.01)	-0.40	(0.02)	0.42	(0.02)	-0.18	(0.02)	0.98	(0.02)
Colombia	5368	382.44	(2.82)	72.30	(1.72)	-1.22	(0.04)	1.18	(0.02)	-1.24	(0.04)	0.76	(0.03)	0.28	(0.03)	0.94	(0.02)
Costa Rica	2805	407.72	(3.10)	67.14	(1.98)	-0.99	(0.05)	1.25	(0.02)	-0.98	(0.05)	0.79	(0.03)	-0.16	(0.03)	0.98	(0.02)
Croatia	3282	473.27	(3.48)	88.05	(2.55)	-0.32	(0.02)	0.86	(0.01)	-0.34	(0.02)	0.44	(0.01)	-0.14	(0.02)	0.91	(0.02)
Czech Republic	3397	505.53	(2.79)	90.19	(1.59)	-0.05	(0.02)	0.76	(0.01)	-0.04	(0.02)	0.37	(0.01)	0.15	(0.02)	0.89	(0.02)
Denmark	4652	506.25	(2.28)	81.10	(1.37)	0.45	(0.02)	0.83	(0.01)	0.41	(0.02)	0.40	(0.01)	-0.02	(0.02)	0.77	(0.01)
Estonia	3142	520.91	(2.26)	80.73	(1.28)	0.10	(0.02)	0.82	(0.01)	0.11	(0.01)	0.40	(0.01)	-0.06	(0.02)	0.82	(0.02)
Finland	5557	523.53	(1.91)	82.32	(1.30)	0.39	(0.02)	0.77	(0.01)	0.33	(0.01)	0.26	(0.01)	-0.06	(0.02)	0.88	(0.02)
France	2933	499.68	(2.81)	95.04	(1.90)	-0.03	(0.02)	0.80	(0.01)	-0.03	(0.02)	0.45	(0.01)	-0.07	(0.02)	0.87	(0.02)
Germany	2600	525.24	(3.22)	90.39	(1.71)	0.21	(0.03)	0.92	(0.01)	0.22	(0.02)	0.49	(0.02)	0.02	(0.02)	0.83	(0.02)
Greece	3341	456.34	(2.53)	86.70	(1.42)	-0.06	(0.03)	1.00	(0.01)	-0.06	(0.03)	0.55	(0.02)	0.08	(0.02)	0.98	(0.03)
Hungary	3121	478.93	(3.16)	90.62	(2.46)	-0.24	(0.03)	0.95	(0.01)	-0.24	(0.03)	0.60	(0.02)	-0.08	(0.03)	0.88	(0.03)
Iceland	2228	497.64	(2.22)	90.92	(1.49)	0.80	(0.02)	0.80	(0.01)	0.79	(0.00)	0.34	(0.00)	-0.17	(0.02)	1.16	(0.02)

Indonesia	3607	376.66	(4.05)	70.55	(3.34)	-1.81	(0.05)	1.10	(0.03)	-1.80	(0.05)	0.70	(0.05)	0.13	(0.02)	0.81	(0.02)
Ireland	3299	502.17	(2.42)	84.24	(1.38)	0.13	(0.02)	0.84	(0.01)	0.13	(0.02)	0.41	(0.02)	0.13	(0.02)	1.00	(0.02)
Israel	3096	475.89	(4.52)	101.70	(1.98)	0.19	(0.03)	0.84	(0.02)	0.18	(0.03)	0.45	(0.02)	0.28	(0.02)	0.98	(0.02)
Italy	20119	488.12	(2.06)	91.94	(1.26)	-0.05	(0.02)	0.97	(0.01)	-0.05	(0.02)	0.52	(0.01)	-0.10	(0.02)	0.90	(0.01)
Japan	4088	538.11	(3.53)	91.91	(2.19)	-0.07	(0.02)	0.72	(0.01)	-0.07	(0.02)	0.35	(0.02)	-0.49	(0.03)	0.96	(0.02)
Jordan	4415	390.67	(2.94)	74.12	(2.54)	-0.42	(0.02)	1.03	(0.01)	-0.42	(0.02)	0.50	(0.02)	0.69	(0.02)	1.18	(0.02)
Kazakhstan	3784	433.25	(3.08)	70.36	(1.86)	-0.30	(0.02)	0.75	(0.01)	-0.31	(0.02)	0.39	(0.02)	0.36	(0.02)	0.86	(0.02)
Latvia	2749	491.14	(2.75)	81.83	(1.65)	-0.25	(0.03)	0.90	(0.02)	-0.25	(0.03)	0.51	(0.02)	0.07	(0.02)	0.74	(0.02)
Lithuania	3048	478.72	(2.82)	88.65	(1.59)	-0.14	(0.02)	0.91	(0.01)	-0.13	(0.02)	0.47	(0.01)	0.08	(0.02)	0.87	(0.02)
Luxembourg	3257	492.19	(1.51)	92.79	(1.35)	0.10	(0.02)	1.09	(0.01)	0.09	(0.01)	0.58	(0.00)	-0.08	(0.02)	1.03	(0.02)
Malaysia	3334	422.36	(3.19)	79.16	(1.84)	-0.72	(0.03)	0.99	(0.02)	-0.73	(0.03)	0.55	(0.03)	0.00	(0.02)	0.90	(0.02)
Mexico	21904	415.42	(1.30)	73.43	(0.75)	-1.10	(0.03)	1.27	(0.01)	-1.10	(0.02)	0.87	(0.02)	0.23	(0.01)	1.02	(0.01)
Montenegro	2989	412.99	(1.64)	81.44	(1.31)	-0.25	(0.02)	0.89	(0.01)	-0.24	(0.01)	0.40	(0.01)	0.03	(0.02)	1.03	(0.02)
Netherlands	2771	530.48	(3.54)	86.56	(2.20)	0.25	(0.02)	0.78	(0.01)	0.26	(0.02)	0.34	(0.02)	-0.21	(0.03)	0.97	(0.02)
New Zealand	2698	502.22	(2.16)	96.83	(1.51)	0.04	(0.02)	0.82	(0.01)	0.04	(0.02)	0.41	(0.02)	0.22	(0.03)	1.10	(0.02)
Norway	2935	492.90	(2.89)	89.33	(1.30)	0.48	(0.02)	0.76	(0.01)	0.47	(0.02)	0.27	(0.02)	-0.21	(0.02)	0.99	(0.02)
Peru	3573	375.39	(3.87)	81.56	(2.23)	-1.15	(0.05)	1.22	(0.03)	-1.18	(0.05)	0.85	(0.04)	0.39	(0.02)	0.97	(0.02)
Poland	2979	519.30	(3.88)	91.03	(2.11)	-0.22	(0.03)	0.90	(0.01)	-0.21	(0.03)	0.47	(0.02)	0.05	(0.02)	0.91	(0.02)
Portugal	3634	490.94	(3.53)	91.65	(1.35)	-0.51	(0.05)	1.18	(0.02)	-0.48	(0.05)	0.69	(0.04)	0.39	(0.03)	1.13	(0.02)
Qatar	6351	384.24	(1.13)	99.03	(0.97)	0.44	(0.01)	0.88	(0.01)	0.44	(0.00)	0.45	(0.00)	0.51	(0.02)	1.28	(0.02)
Republic of Korea	3332	554.39	(4.53)	98.06	(2.17)	0.00	(0.03)	0.74	(0.01)	0.01	(0.03)	0.36	(0.02)	-0.73	(0.03)	0.99	(0.02)
Romania	3304	446.13	(3.92)	80.35	(2.27)	-0.45	(0.04)	0.93	(0.03)	-0.45	(0.04)	0.58	(0.04)	0.23	(0.02)	0.93	(0.02)
Russian Federation	3417	483.51	(2.98)	84.89	(1.60)	-0.10	(0.03)	0.76	(0.01)	-0.10	(0.02)	0.41	(0.02)	0.21	(0.02)	0.89	(0.02)
Serbia	2977	450.61	(3.46)	90.71	(2.47)	-0.30	(0.03)	0.90	(0.01)	-0.29	(0.02)	0.45	(0.02)	-0.02	(0.02)	1.00	(0.03)
Shanghai-China	3453	612.64	(3.37)	100.44	(2.42)	-0.37	(0.04)	0.96	(0.02)	-0.36	(0.04)	0.57	(0.03)	0.16	(0.02)	0.98	(0.02)
Singapore	3645	575.96	(1.75)	103.10	(1.07)	-0.26	(0.02)	0.91	(0.01)	-0.26	(0.01)	0.47	(0.01)	0.29	(0.02)	1.03	(0.02)
Slovakia	2997	485.75	(3.40)	98.46	(2.42)	-0.16	(0.03)	0.89	(0.02)	-0.16	(0.03)	0.54	(0.02)	-0.19	(0.02)	0.84	(0.02)
Slovenia	3696	504.80	(1.71)	90.51	(1.34)	0.08	(0.02)	0.88	(0.01)	0.08	(0.01)	0.48	(0.01)	-0.02	(0.02)	0.85	(0.02)
Spain	16359	486.54	(1.97)	86.33	(0.89)	-0.18	(0.02)	1.02	(0.01)	-0.17	(0.02)	0.54	(0.02)	0.10	(0.02)	1.00	(0.01)
Sweden	2948	483.81	(2.41)	88.80	(1.52)	0.30	(0.02)	0.81	(0.01)	0.28	(0.02)	0.34	(0.02)	-0.21	(0.02)	1.04	(0.02)

Switzerland	7240	532.63	(3.13)	92.91	(1.52)	0.18	(0.02)	0.90	(0.01)	0.18	(0.02)	0.41	(0.01)	0.07	(0.01)	0.85	(0.02)
Thailand	4344	427.68	(3.53)	81.01	(2.33)	-1.35	(0.05)	1.17	(0.02)	-1.35	(0.04)	0.75	(0.03)	0.11	(0.02)	0.83	(0.02)
Tunisia	2690	390.39	(3.90)	75.92	(3.08)	-1.19	(0.05)	1.24	(0.03)	-1.18	(0.05)	0.74	(0.04)	0.08	(0.02)	0.97	(0.02)
Turkey	3143	449.90	(4.96)	90.20	(3.29)	-1.44	(0.04)	1.11	(0.02)	-1.45	(0.04)	0.61	(0.03)	-0.04	(0.03)	1.01	(0.02)
United Arab Emirates	7228	436.39	(2.61)	87.98	(1.28)	0.32	(0.02)	0.85	(0.01)	0.33	(0.02)	0.46	(0.02)	0.47	(0.02)	1.06	(0.02)
United Kingdom	8109	500.09	(2.92)	91.95	(1.62)	0.29	(0.02)	0.81	(0.01)	0.28	(0.02)	0.39	(0.02)	0.34	(0.02)	1.00	(0.02)
United States of America	3192	485.23	(3.53)	89.01	(1.48)	0.19	(0.04)	0.97	(0.02)	0.18	(0.04)	0.53	(0.03)	0.40	(0.03)	1.13	(0.02)
Uruguay	3234	415.30	(2.63)	86.05	(1.88)	-0.85	(0.03)	1.14	(0.02)	-0.85	(0.03)	0.74	(0.03)	0.22	(0.02)	1.00	(0.02)
Viet Nam	3280	511.95	(4.97)	85.97	(2.73)	-1.80	(0.05)	1.12	(0.03)	-1.81	(0.05)	0.74	(0.04)	-0.32	(0.02)	0.67	(0.01)

Table A1. Descriptive statistics for the variables in the analytic sample

Education system	TCHBEHTD				TCHBEHSO				STUDREL.M				DISCLIMA				CLSMAN			
	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.	Mean	s.e.	SD	s.e.
Argentina	0.27	(0.03)	1.05	(0.02)	0.43	(0.03)	1.04	(0.02)	0.17	(0.03)	0.38	(0.02)	-0.49	(0.03)	0.88	(0.02)	-0.16	(0.03)	0.90	(0.02)
Australia	0.04	(0.01)	1.01	(0.01)	-0.04	(0.02)	0.94	(0.01)	0.15	(0.01)	0.37	(0.01)	-0.13	(0.02)	1.03	(0.01)	0.03	(0.01)	1.01	(0.01)
Austria	-0.10	(0.02)	0.93	(0.02)	-0.28	(0.02)	1.00	(0.01)	-0.14	(0.03)	0.38	(0.02)	0.21	(0.03)	1.08	(0.02)	0.02	(0.03)	1.10	(0.02)
Belgium	-0.10	(0.02)	0.95	(0.01)	-0.27	(0.02)	0.98	(0.01)	-0.11	(0.02)	0.27	(0.01)	0.05	(0.03)	1.03	(0.01)	0.06	(0.03)	1.03	(0.01)
Brazil	0.30	(0.02)	1.09	(0.01)	0.42	(0.02)	1.00	(0.01)	0.26	(0.02)	0.38	(0.01)	-0.34	(0.02)	0.94	(0.01)	0.00	(0.02)	0.95	(0.01)
Bulgaria	0.55	(0.03)	1.05	(0.02)	0.69	(0.03)	1.06	(0.02)	0.24	(0.02)	0.38	(0.02)	-0.19	(0.03)	0.90	(0.02)	0.20	(0.03)	1.02	(0.02)
Canada	0.21	(0.02)	1.06	(0.01)	0.05	(0.02)	0.97	(0.01)	0.28	(0.01)	0.34	(0.01)	0.01	(0.01)	0.97	(0.01)	0.17	(0.02)	1.04	(0.01)
Chile	0.36	(0.03)	1.07	(0.01)	0.36	(0.03)	0.96	(0.02)	0.19	(0.02)	0.34	(0.02)	-0.25	(0.02)	0.90	(0.01)	-0.04	(0.03)	1.00	(0.02)
China, Hong Kong	-0.31	(0.02)	0.97	(0.02)	-0.36	(0.03)	1.03	(0.02)	0.03	(0.02)	0.24	(0.01)	0.29	(0.03)	0.97	(0.01)	-0.02	(0.03)	0.96	(0.02)
China, Macao	-0.04	(0.02)	0.92	(0.01)	0.12	(0.02)	0.87	(0.01)	-0.05	(0.00)	0.19	(0.00)	0.10	(0.01)	0.79	(0.01)	0.00	(0.02)	0.89	(0.01)
Chinese Taipei	-0.09	(0.02)	1.04	(0.02)	-0.02	(0.02)	0.97	(0.01)	0.03	(0.02)	0.28	(0.02)	-0.01	(0.03)	0.98	(0.01)	-0.11	(0.02)	0.95	(0.01)
Colombia	0.42	(0.03)	1.03	(0.02)	0.77	(0.02)	0.81	(0.02)	0.45	(0.02)	0.33	(0.02)	-0.05	(0.02)	0.84	(0.02)	0.30	(0.03)	0.95	(0.01)
Costa Rica	0.15	(0.03)	1.07	(0.02)	0.37	(0.03)	0.97	(0.02)	0.47	(0.02)	0.33	(0.02)	0.04	(0.03)	0.88	(0.02)	0.47	(0.03)	1.03	(0.01)
Croatia	0.06	(0.02)	0.98	(0.02)	-0.38	(0.03)	1.00	(0.02)	-0.15	(0.02)	0.33	(0.02)	-0.12	(0.03)	1.02	(0.01)	-0.04	(0.03)	1.03	(0.02)
Czech Republic	0.14	(0.03)	0.90	(0.02)	0.04	(0.02)	0.84	(0.02)	-0.16	(0.03)	0.37	(0.02)	0.10	(0.04)	1.09	(0.02)	0.01	(0.04)	1.00	(0.02)
Denmark	-0.29	(0.02)	0.86	(0.02)	0.19	(0.02)	0.79	(0.01)	0.15	(0.02)	0.36	(0.01)	-0.01	(0.03)	0.89	(0.02)	-0.10	(0.03)	0.91	(0.02)
Estonia	-0.16	(0.02)	0.85	(0.02)	-0.14	(0.02)	0.86	(0.01)	-0.08	(0.02)	0.33	(0.02)	0.20	(0.03)	0.96	(0.01)	0.16	(0.03)	0.99	(0.02)
Finland	-0.12	(0.02)	0.88	(0.01)	-0.06	(0.02)	0.81	(0.01)	-0.08	(0.02)	0.28	(0.01)	-0.32	(0.02)	0.86	(0.01)	-0.21	(0.02)	0.90	(0.01)
France	-0.06	(0.03)	1.07	(0.02)	-0.42	(0.02)	0.93	(0.01)	-0.17	(0.02)	0.32	(0.01)	-0.28	(0.03)	1.05	(0.01)	-0.13	(0.03)	1.14	(0.02)
Germany	-0.05	(0.02)	0.88	(0.02)	-0.06	(0.02)	0.93	(0.02)	-0.21	(0.02)	0.39	(0.02)	-0.02	(0.03)	1.02	(0.02)	-0.04	(0.02)	1.06	(0.02)
Greece	0.21	(0.02)	1.04	(0.02)	-0.17	(0.03)	1.13	(0.02)	-0.14	(0.02)	0.35	(0.02)	-0.24	(0.03)	0.90	(0.02)	-0.19	(0.03)	1.01	(0.02)
Hungary	-0.01	(0.03)	0.97	(0.03)	-0.41	(0.03)	1.01	(0.02)	-0.02	(0.02)	0.36	(0.03)	0.06	(0.04)	1.02	(0.02)	-0.07	(0.04)	1.02	(0.02)
Iceland	-0.07	(0.02)	0.92	(0.02)	0.30	(0.02)	0.92	(0.02)	0.22	(0.01)	0.37	(0.00)	-0.02	(0.02)	0.90	(0.02)	0.17	(0.02)	1.00	(0.01)
Indonesia	0.38	(0.02)	0.88	(0.02)	0.70	(0.02)	0.75	(0.02)	0.42	(0.02)	0.25	(0.01)	0.14	(0.02)	0.88	(0.01)	0.17	(0.02)	0.75	(0.01)
Ireland	-0.08	(0.02)	0.98	(0.02)	-0.58	(0.03)	0.94	(0.01)	0.03	(0.02)	0.29	(0.02)	0.13	(0.03)	1.10	(0.02)	0.15	(0.03)	1.11	(0.02)

Israel	0.23	(0.03)	1.02	(0.02)	0.21	(0.03)	0.97	(0.02)	0.07	(0.03)	0.41	(0.02)	0.27	(0.03)	1.07	(0.01)	0.20	(0.03)	1.05	(0.01)
Italy	-0.16	(0.02)	0.98	(0.01)	-0.03	(0.01)	0.90	(0.01)	-0.16	(0.01)	0.36	(0.01)	-0.04	(0.02)	0.99	(0.01)	-0.05	(0.02)	1.03	(0.01)
Japan	-0.25	(0.02)	0.89	(0.02)	-0.13	(0.03)	0.92	(0.01)	-0.17	(0.02)	0.33	(0.02)	0.67	(0.03)	0.90	(0.02)	0.14	(0.02)	0.77	(0.01)
Jordan	0.70	(0.03)	1.25	(0.02)	1.00	(0.03)	1.17	(0.02)	0.38	(0.02)	0.32	(0.01)	-0.22	(0.03)	1.06	(0.01)	0.33	(0.03)	0.98	(0.01)
Kazakhstan	0.93	(0.03)	0.98	(0.01)	0.92	(0.02)	0.84	(0.02)	0.75	(0.03)	0.35	(0.02)	0.72	(0.03)	0.99	(0.01)	0.65	(0.03)	0.91	(0.01)
Latvia	0.24	(0.03)	0.89	(0.03)	0.23	(0.03)	0.84	(0.02)	0.15	(0.02)	0.35	(0.02)	0.08	(0.04)	0.95	(0.02)	0.17	(0.03)	0.89	(0.02)
Lithuania	0.15	(0.02)	0.90	(0.02)	0.18	(0.03)	0.94	(0.02)	0.43	(0.02)	0.40	(0.02)	0.28	(0.03)	1.06	(0.01)	0.47	(0.03)	1.07	(0.01)
Luxembourg	-0.12	(0.02)	1.05	(0.02)	-0.25	(0.02)	1.10	(0.01)	-0.05	(0.00)	0.21	(0.00)	-0.03	(0.02)	1.08	(0.01)	-0.02	(0.02)	1.12	(0.01)
Malaysia	0.20	(0.02)	0.93	(0.02)	0.62	(0.03)	0.94	(0.02)	0.23	(0.02)	0.31	(0.02)	-0.21	(0.02)	0.82	(0.01)	0.19	(0.02)	0.85	(0.01)
Mexico	0.34	(0.02)	1.07	(0.01)	0.54	(0.01)	0.98	(0.01)	0.47	(0.01)	0.36	(0.01)	0.06	(0.01)	0.90	(0.01)	0.29	(0.01)	0.96	(0.01)
Montenegro	0.24	(0.02)	1.12	(0.01)	0.16	(0.02)	1.10	(0.01)	0.12	(0.01)	0.35	(0.00)	-0.01	(0.02)	1.00	(0.01)	0.17	(0.02)	1.02	(0.02)
Netherlands	-0.11	(0.03)	0.96	(0.02)	-0.07	(0.03)	1.03	(0.02)	-0.15	(0.02)	0.24	(0.01)	-0.16	(0.03)	0.92	(0.02)	-0.29	(0.03)	0.90	(0.02)
New Zealand	-0.05	(0.03)	1.03	(0.02)	0.06	(0.03)	1.00	(0.02)	0.10	(0.02)	0.32	(0.02)	-0.24	(0.03)	1.00	(0.02)	-0.10	(0.03)	0.95	(0.02)
Norway	-0.20	(0.03)	0.93	(0.02)	0.24	(0.02)	0.81	(0.02)	-0.13	(0.02)	0.33	(0.01)	-0.08	(0.03)	0.86	(0.01)	-0.10	(0.03)	0.88	(0.01)
Peru	0.29	(0.02)	1.02	(0.02)	0.59	(0.02)	0.89	(0.02)	0.38	(0.02)	0.34	(0.02)	-0.03	(0.02)	0.78	(0.01)	0.17	(0.02)	0.88	(0.01)
Poland	-0.22	(0.02)	0.94	(0.02)	-0.10	(0.03)	0.98	(0.02)	-0.42	(0.02)	0.37	(0.02)	0.08	(0.04)	1.05	(0.02)	-0.15	(0.04)	1.01	(0.02)
Portugal	0.27	(0.03)	1.06	(0.02)	0.24	(0.04)	1.15	(0.02)	0.33	(0.02)	0.29	(0.01)	0.01	(0.03)	0.97	(0.01)	0.01	(0.03)	1.01	(0.02)
Qatar	0.49	(0.01)	1.23	(0.01)	1.09	(0.01)	1.16	(0.01)	0.08	(0.00)	0.27	(0.00)	-0.32	(0.01)	1.12	(0.01)	-0.03	(0.01)	0.92	(0.01)
Republic of Korea	-0.31	(0.02)	0.89	(0.02)	-0.17	(0.02)	0.97	(0.01)	-0.12	(0.03)	0.31	(0.03)	0.19	(0.03)	0.87	(0.01)	-0.26	(0.02)	0.78	(0.02)
Romania	0.25	(0.03)	1.07	(0.02)	0.40	(0.04)	1.14	(0.02)	0.37	(0.02)	0.35	(0.02)	0.02	(0.04)	1.00	(0.01)	0.25	(0.03)	0.99	(0.01)
Russian Federation	0.78	(0.03)	1.00	(0.01)	0.56	(0.02)	0.86	(0.02)	0.14	(0.03)	0.39	(0.02)	0.35	(0.03)	1.02	(0.02)	0.41	(0.03)	0.91	(0.01)
Serbia	0.25	(0.03)	1.08	(0.02)	0.27	(0.03)	1.04	(0.02)	0.08	(0.02)	0.33	(0.02)	-0.15	(0.03)	1.01	(0.02)	-0.02	(0.03)	1.03	(0.02)
Shanghai-China	0.54	(0.03)	1.05	(0.02)	-0.20	(0.03)	1.09	(0.02)	0.46	(0.03)	0.36	(0.02)	0.57	(0.03)	0.95	(0.01)	0.22	(0.03)	0.96	(0.01)
Singapore	0.21	(0.02)	0.96	(0.01)	0.08	(0.02)	1.02	(0.01)	0.36	(0.01)	0.28	(0.01)	0.21	(0.02)	1.00	(0.01)	0.24	(0.02)	0.97	(0.01)
Slovakia	-0.04	(0.02)	0.94	(0.02)	0.06	(0.03)	0.99	(0.02)	-0.18	(0.02)	0.37	(0.02)	-0.13	(0.03)	0.93	(0.02)	-0.09	(0.03)	0.88	(0.02)
Slovenia	0.10	(0.02)	1.00	(0.02)	-0.30	(0.02)	1.07	(0.01)	-0.24	(0.01)	0.36	(0.02)	0.07	(0.02)	1.04	(0.01)	0.04	(0.02)	0.98	(0.02)
Spain	-0.13	(0.02)	0.98	(0.01)	-0.14	(0.02)	1.04	(0.01)	0.00	(0.02)	0.35	(0.01)	-0.04	(0.02)	1.03	(0.01)	-0.05	(0.02)	1.01	(0.01)
Sweden	-0.04	(0.02)	0.99	(0.02)	0.44	(0.02)	0.85	(0.02)	0.08	(0.03)	0.36	(0.02)	-0.20	(0.03)	0.89	(0.01)	-0.15	(0.03)	0.91	(0.02)
Switzerland	-0.04	(0.02)	0.90	(0.01)	0.15	(0.02)	0.98	(0.01)	0.11	(0.02)	0.38	(0.02)	0.07	(0.03)	0.98	(0.01)	0.10	(0.03)	1.02	(0.02)
Thailand	0.58	(0.02)	0.99	(0.01)	0.94	(0.03)	0.98	(0.02)	0.30	(0.02)	0.29	(0.01)	0.07	(0.02)	0.77	(0.01)	0.08	(0.01)	0.76	(0.01)

Tunisia	0.19	(0.03)	1.19	(0.02)	0.58	(0.03)	1.05	(0.02)	-0.02	(0.03)	0.33	(0.02)	-0.43	(0.02)	0.87	(0.01)	0.16	(0.02)	1.01	(0.02)
Turkey	0.39	(0.03)	1.16	(0.02)	0.31	(0.03)	1.04	(0.02)	0.19	(0.02)	0.31	(0.02)	-0.08	(0.02)	0.91	(0.01)	0.18	(0.03)	0.95	(0.01)
United Arab Emirates	0.56	(0.02)	1.14	(0.01)	0.87	(0.02)	1.06	(0.01)	0.35	(0.02)	0.36	(0.01)	0.03	(0.02)	1.04	(0.01)	0.24	(0.02)	1.01	(0.01)
United Kingdom	0.15	(0.02)	0.93	(0.02)	0.02	(0.02)	0.90	(0.01)	0.15	(0.02)	0.32	(0.01)	0.15	(0.02)	1.07	(0.01)	0.16	(0.02)	1.03	(0.01)
United States of America	0.29	(0.03)	1.07	(0.01)	0.29	(0.03)	0.92	(0.02)	0.21	(0.03)	0.32	(0.02)	0.07	(0.03)	1.00	(0.02)	0.22	(0.03)	1.01	(0.01)
Uruguay	0.09	(0.03)	1.01	(0.02)	0.23	(0.03)	0.96	(0.02)	0.18	(0.02)	0.35	(0.02)	-0.15	(0.03)	0.97	(0.01)	0.00	(0.02)	0.91	(0.01)
Viet Nam	0.29	(0.02)	0.81	(0.01)	0.30	(0.02)	0.82	(0.01)	0.01	(0.02)	0.30	(0.02)	0.36	(0.02)	0.70	(0.01)	0.21	(0.02)	0.77	(0.01)

Table A2. Correlation matrix for the variables in the analytic sample

Argentine

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.60	-0.01	-0.08	-0.11	-0.30	-0.02	-0.07	0.37
ESCS.M	0.60	1.00	-0.07	-0.15	-0.21	-0.49	0.00	-0.11	0.52
COGACT	-0.01	-0.07	1.00	0.58	0.48	0.15	-0.01	0.29	-0.08
TCHBEHTD	-0.08	-0.15	0.58	1.00	0.52	0.20	0.03	0.33	-0.14
TCHBEHSO	-0.11	-0.21	0.48	0.52	1.00	0.20	-0.07	0.19	-0.25
STUDREL.M	-0.30	-0.49	0.15	0.20	0.20	1.00	0.11	0.21	-0.23
DISCLIMA	-0.02	0.00	-0.01	0.03	-0.07	0.11	1.00	0.38	0.10
CLSMAN	-0.07	-0.11	0.29	0.33	0.19	0.21	0.38	1.00	-0.06
MATH	0.37	0.52	-0.08	-0.14	-0.25	-0.23	0.10	-0.06	1

Australia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.53	0.10	0.08	-0.04	0.21	0.12	0.12	0.35
ESCS.M	0.53	1.00	0.08	0.05	-0.10	0.40	0.14	0.13	0.40
COGACT	0.10	0.08	1.00	0.67	0.41	0.16	0.25	0.47	0.13
TCHBEHTD	0.08	0.05	0.67	1.00	0.43	0.15	0.30	0.47	0.11
TCHBEHSO	-0.04	-0.10	0.41	0.43	1.00	0.02	0.04	0.14	-0.17
STUDREL.M	0.21	0.40	0.16	0.15	0.02	1.00	0.16	0.18	0.22
DISCLIMA	0.12	0.14	0.25	0.30	0.04	0.16	1.00	0.65	0.31
CLSMAN	0.12	0.13	0.47	0.47	0.14	0.18	0.65	1.00	0.23
MATH	0.35	0.40	0.13	0.11	-0.17	0.22	0.31	0.23	1

Austria

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.56	0.03	-0.02	-0.16	-0.06	0.07	0.06	0.40
ESCS.M	0.56	1.00	-0.02	-0.09	-0.29	-0.13	0.13	0.08	0.52
COGACT	0.03	-0.02	1.00	0.63	0.40	0.14	0.14	0.32	0.01

TCHBEHTD	-0.02	-0.09	0.63	1.00	0.38	0.13	0.20	0.36	-0.08
TCHBEHSO	-0.16	-0.29	0.40	0.38	1.00	0.16	-0.06	0.07	-0.31
STUDREL.M	-0.06	-0.13	0.14	0.13	0.16	1.00	0.08	0.07	-0.03
DISCLIMA	0.07	0.13	0.14	0.20	-0.06	0.08	1.00	0.66	0.17
CLSMAN	0.06	0.08	0.32	0.36	0.07	0.07	0.66	1.00	0.10
MATH	0.40	0.52	0.01	-0.08	-0.31	-0.03	0.17	0.10	1

Belgium

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.53	0.08	-0.06	-0.05	-0.04	0.09	0.06	0.44
ESCS.M	0.53	1.00	0.08	-0.07	-0.14	-0.07	0.13	0.08	0.59
COGACT	0.08	0.08	1.00	0.59	0.31	0.11	0.10	0.33	0.09
TCHBEHTD	-0.06	-0.07	0.59	1.00	0.34	0.14	0.12	0.33	-0.07
TCHBEHSO	-0.05	-0.14	0.31	0.34	1.00	0.01	-0.07	0.03	-0.16
STUDREL.M	-0.04	-0.07	0.11	0.14	0.01	1.00	0.02	0.09	-0.05
DISCLIMA	0.09	0.13	0.10	0.12	-0.07	0.02	1.00	0.59	0.21
CLSMAN	0.06	0.08	0.33	0.33	0.03	0.09	0.59	1.00	0.13
MATH	0.44	0.59	0.09	-0.07	-0.16	-0.05	0.21	0.13	1

Brazil

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.66	0.04	-0.05	-0.10	-0.07	0.03	0.01	0.41
ESCS.M	0.66	1.00	0.00	-0.11	-0.18	-0.11	0.05	-0.01	0.51
COGACT	0.04	0.00	1.00	0.62	0.52	0.16	-0.06	0.27	-0.08
TCHBEHTD	-0.05	-0.11	0.62	1.00	0.50	0.20	0.05	0.36	-0.18
TCHBEHSO	-0.10	-0.18	0.52	0.50	1.00	0.12	-0.11	0.13	-0.30
STUDREL.M	-0.07	-0.11	0.16	0.20	0.12	1.00	0.05	0.18	-0.07
DISCLIMA	0.03	0.05	-0.06	0.05	-0.11	0.05	1.00	0.42	0.14
CLSMAN	0.01	-0.01	0.27	0.36	0.13	0.18	0.42	1.00	-0.03
MATH	0.41	0.51	-0.08	-0.18	-0.30	-0.07	0.14	-0.03	1

Bulgaria

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.66	0.05	-0.02	-0.22	-0.25	0.09	0.07	0.46
ESCS.M	0.66	1.00	0.02	-0.04	-0.34	-0.41	0.14	0.06	0.57
COGACT	0.05	0.02	1.00	0.65	0.48	0.17	-0.05	0.31	-0.01
TCHBEHTD	-0.02	-0.04	0.65	1.00	0.52	0.23	0.05	0.35	-0.04
TCHBEHSO	-0.22	-0.34	0.48	0.52	1.00	0.27	-0.16	0.10	-0.38
STUDREL.M	-0.25	-0.41	0.17	0.23	0.27	1.00	0.01	0.13	-0.24
DISCLIMA	0.09	0.14	-0.05	0.05	-0.16	0.01	1.00	0.42	0.25
CLSMAN	0.07	0.06	0.31	0.35	0.10	0.13	0.42	1.00	0.11
MATH	0.46	0.57	-0.01	-0.04	-0.38	-0.24	0.25	0.11	1

Canada

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.46	0.08	0.05	-0.04	0.06	0.06	0.07	0.30
ESCS.M	0.46	1.00	0.04	0.02	-0.07	0.14	0.05	0.03	0.28
COGACT	0.08	0.04	1.00	0.67	0.41	0.12	0.12	0.40	0.07
TCHBEHTD	0.05	0.02	0.67	1.00	0.44	0.16	0.18	0.42	0.04
TCHBEHSO	-0.04	-0.07	0.41	0.44	1.00	0.06	-0.06	0.07	-0.24
STUDREL.M	0.06	0.14	0.12	0.16	0.06	1.00	0.07	0.11	0.06
DISCLIMA	0.06	0.05	0.12	0.18	-0.06	0.07	1.00	0.57	0.20
CLSMAN	0.07	0.03	0.40	0.42	0.07	0.11	0.57	1.00	0.18
MATH	0.30	0.28	0.07	0.04	-0.24	0.06	0.20	0.18	1

Chile

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.74	0.05	-0.07	-0.13	-0.09	0.05	-0.02	0.49
ESCS.M	0.74	1.00	0.02	-0.11	-0.19	-0.10	0.08	-0.02	0.65

COGACT	0.05	0.02	1.00	0.62	0.45	0.15	0.11	0.35	0.03
TCHBEHTD	-0.07	-0.11	0.62	1.00	0.50	0.17	0.14	0.39	-0.13
TCHBEHSO	-0.13	-0.19	0.45	0.50	1.00	0.13	0.02	0.17	-0.21
STUDREL.M	-0.09	-0.10	0.15	0.17	0.13	1.00	0.09	0.16	-0.01
DISCLIMA	0.05	0.08	0.11	0.14	0.02	0.09	1.00	0.56	0.09
CLSMAN	-0.02	-0.02	0.35	0.39	0.17	0.16	0.56	1.00	0.01
MATH	0.49	0.65	0.03	-0.13	-0.21	-0.01	0.09	0.01	1

China, Hong Kong

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.58	0.07	0.06	0.03	-0.07	0.03	0.02	0.27
ESCS.M	0.58	1.00	0.04	0.00	-0.07	-0.15	0.03	0.01	0.40
COGACT	0.07	0.04	1.00	0.65	0.36	0.12	0.16	0.41	0.08
TCHBEHTD	0.06	0.00	0.65	1.00	0.42	0.15	0.17	0.41	0.02
TCHBEHSO	0.03	-0.07	0.36	0.42	1.00	0.04	-0.04	0.06	-0.25
STUDREL.M	-0.07	-0.15	0.12	0.15	0.04	1.00	0.07	0.12	-0.01
DISCLIMA	0.03	0.03	0.16	0.17	-0.04	0.07	1.00	0.57	0.14
CLSMAN	0.02	0.01	0.41	0.41	0.06	0.12	0.57	1.00	0.10
MATH	0.27	0.40	0.08	0.02	-0.25	-0.01	0.14	0.10	1

China, Macao

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	0.11	0.04	-0.02	0.08	0.07	0.06	0.16
ESCS.M	0.52	1.00	0.07	-0.05	-0.11	0.14	0.04	0.01	0.20
COGACT	0.11	0.07	1.00	0.62	0.39	0.08	0.06	0.29	0.01
TCHBEHTD	0.04	-0.05	0.62	1.00	0.39	0.12	0.17	0.35	0.00
TCHBEHSO	-0.02	-0.11	0.39	0.39	1.00	0.08	0.02	0.12	-0.21
STUDREL.M	0.08	0.14	0.08	0.12	0.08	1.00	0.04	0.04	0.11
DISCLIMA	0.07	0.04	0.06	0.17	0.02	0.04	1.00	0.51	0.14
CLSMAN	0.06	0.01	0.29	0.35	0.12	0.04	0.51	1.00	0.09

MATH	0.16	0.20	0.01	0.00	-0.21	0.11	0.14	0.09	1

Chinese Taipei

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.51	0.12	0.03	-0.09	0.06	0.12	0.07	0.43
ESCS.M	0.51	1.00	0.12	0.02	-0.14	0.12	0.20	0.11	0.58
COGACT	0.12	0.12	1.00	0.61	0.31	0.13	0.14	0.34	0.12
TCHBEHTD	0.03	0.02	0.61	1.00	0.41	0.11	0.17	0.38	-0.01
TCHBEHSO	-0.09	-0.14	0.31	0.41	1.00	0.04	-0.06	0.07	-0.29
STUDREL.M	0.06	0.12	0.13	0.11	0.04	1.00	0.14	0.13	0.16
DISCLIMA	0.12	0.20	0.14	0.17	-0.06	0.14	1.00	0.56	0.23
CLSMAN	0.07	0.11	0.34	0.38	0.07	0.13	0.56	1.00	0.12
MATH	0.43	0.58	0.12	-0.01	-0.29	0.16	0.23	0.12	1

Colombia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.65	0.10	-0.01	-0.02	-0.12	0.03	-0.01	0.37
ESCS.M	0.65	1.00	0.08	-0.04	-0.10	-0.17	0.03	-0.03	0.44
COGACT	0.10	0.08	1.00	0.56	0.45	0.13	-0.02	0.27	0.05
TCHBEHTD	-0.01	-0.04	0.56	1.00	0.50	0.19	0.07	0.34	-0.11
TCHBEHSO	-0.02	-0.10	0.45	0.50	1.00	0.16	-0.11	0.13	-0.16
STUDREL.M	-0.12	-0.17	0.13	0.19	0.16	1.00	0.06	0.17	-0.13
DISCLIMA	0.03	0.03	-0.02	0.07	-0.11	0.06	1.00	0.41	0.13
CLSMAN	-0.01	-0.03	0.27	0.34	0.13	0.17	0.41	1.00	-0.02
MATH	0.37	0.44	0.05	-0.11	-0.16	-0.13	0.13	-0.02	1

Costa Rica

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.65	0.13	-0.06	-0.06	-0.23	-0.01	-0.01	0.44

ESCS.M	0.65	1.00	0.10	-0.10	-0.11	-0.38	0.03	0.01	0.49
COGACT	0.13	0.10	1.00	0.56	0.47	0.06	-0.04	0.26	0.05
TCHBEHTD	-0.06	-0.10	0.56	1.00	0.51	0.19	0.10	0.36	-0.16
TCHBEHSO	-0.06	-0.11	0.47	0.51	1.00	0.17	-0.06	0.13	-0.22
STUDREL.M	-0.23	-0.38	0.06	0.19	0.17	1.00	0.00	0.13	-0.24
DISCLIMA	-0.01	0.03	-0.04	0.10	-0.06	0.00	1.00	0.39	0.09
CLSMAN	-0.01	0.01	0.26	0.36	0.13	0.13	0.39	1.00	0.00
MATH	0.44	0.49	0.05	-0.16	-0.22	-0.24	0.09	0.00	1

Croatia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.51	0.04	-0.06	-0.08	-0.11	0.13	0.05	0.35
ESCS.M	0.51	1.00	0.04	-0.09	-0.16	-0.25	0.22	0.07	0.50
COGACT	0.04	0.04	1.00	0.55	0.38	0.11	0.04	0.30	0.05
TCHBEHTD	-0.06	-0.09	0.55	1.00	0.44	0.14	0.12	0.40	-0.09
TCHBEHSO	-0.08	-0.16	0.38	0.44	1.00	0.18	-0.10	0.12	-0.24
STUDREL.M	-0.11	-0.25	0.11	0.14	0.18	1.00	0.01	0.09	-0.07
DISCLIMA	0.13	0.22	0.04	0.12	-0.10	0.01	1.00	0.55	0.31
CLSMAN	0.05	0.07	0.30	0.40	0.12	0.09	0.55	1.00	0.12
MATH	0.35	0.50	0.05	-0.09	-0.24	-0.07	0.31	0.12	1

Czech Republic

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.50	0.01	-0.05	-0.11	-0.05	0.06	0.02	0.40
ESCS.M	0.50	1.00	-0.03	-0.10	-0.18	-0.08	0.13	0.05	0.62
COGACT	0.01	-0.03	1.00	0.60	0.37	0.11	0.09	0.33	-0.02
TCHBEHTD	-0.05	-0.10	0.60	1.00	0.38	0.13	0.13	0.34	-0.07
TCHBEHSO	-0.11	-0.18	0.37	0.38	1.00	0.04	-0.09	0.08	-0.24
STUDREL.M	-0.05	-0.08	0.11	0.13	0.04	1.00	0.15	0.18	0.00
DISCLIMA	0.06	0.13	0.09	0.13	-0.09	0.15	1.00	0.60	0.23

CLSMAN	0.02	0.05	0.33	0.34	0.08	0.18	0.60	1.00	0.11
MATH	0.40	0.62	-0.02	-0.07	-0.24	0.00	0.23	0.11	1

Denmark

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.43	0.07	0.01	0.02	0.11	0.08	0.09	0.41
ESCS.M	0.43	1.00	0.04	-0.03	-0.01	0.22	0.14	0.07	0.35
COGACT	0.07	0.04	1.00	0.62	0.41	0.16	0.21	0.41	0.07
TCHBEHTD	0.01	-0.03	0.62	1.00	0.47	0.12	0.23	0.39	-0.07
TCHBEHSO	0.02	-0.01	0.41	0.47	1.00	0.05	0.10	0.18	-0.09
STUDREL.M	0.11	0.22	0.16	0.12	0.05	1.00	0.16	0.16	0.09
DISCLIMA	0.08	0.14	0.21	0.23	0.10	0.16	1.00	0.60	0.14
CLSMAN	0.09	0.07	0.41	0.39	0.18	0.16	0.60	1.00	0.10
MATH	0.41	0.35	0.07	-0.07	-0.09	0.09	0.14	0.10	1

Estonia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.49	0.01	-0.05	-0.04	0.00	0.02	-0.01	0.29
ESCS.M	0.49	1.00	-0.01	-0.09	-0.11	0.02	-0.02	-0.07	0.27
COGACT	0.01	-0.01	1.00	0.62	0.42	0.10	0.10	0.38	0.02
TCHBEHTD	-0.05	-0.09	0.62	1.00	0.48	0.12	0.15	0.42	-0.08
TCHBEHSO	-0.04	-0.11	0.42	0.48	1.00	0.10	-0.04	0.16	-0.18
STUDREL.M	0.00	0.02	0.10	0.12	0.10	1.00	0.06	0.11	0.03
DISCLIMA	0.02	-0.02	0.10	0.15	-0.04	0.06	1.00	0.59	0.20
CLSMAN	-0.01	-0.07	0.38	0.42	0.16	0.11	0.59	1.00	0.09
MATH	0.29	0.27	0.02	-0.08	-0.18	0.03	0.20	0.09	1

Finland

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH

ESCS	1.00	0.32	0.07	0.04	0.00	0.04	0.04	0.05	0.31
ESCS.M	0.32	1.00	0.03	0.01	0.00	0.07	0.02	-0.02	0.20
COGACT	0.07	0.03	1.00	0.66	0.43	0.08	0.14	0.41	0.05
TCHBEHTD	0.04	0.01	0.66	1.00	0.47	0.12	0.19	0.41	0.03
TCHBEHSO	0.00	0.00	0.43	0.47	1.00	0.09	0.07	0.21	-0.14
STUDREL.M	0.04	0.07	0.08	0.12	0.09	1.00	0.05	0.09	0.03
DISCLIMA	0.04	0.02	0.14	0.19	0.07	0.05	1.00	0.62	0.09
CLSMAN	0.05	-0.02	0.41	0.41	0.21	0.09	0.62	1.00	0.07
MATH	0.31	0.20	0.05	0.03	-0.14	0.03	0.09	0.07	1

France

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.55	-0.01	-0.10	-0.10	-0.12	0.11	0.05	0.47
ESCS.M	0.55	1.00	-0.03	-0.15	-0.21	-0.21	0.16	0.04	0.63
COGACT	-0.01	-0.03	1.00	0.60	0.37	0.10	0.15	0.36	-0.01
TCHBEHTD	-0.10	-0.15	0.60	1.00	0.34	0.14	0.20	0.39	-0.15
TCHBEHSO	-0.10	-0.21	0.37	0.34	1.00	0.09	-0.01	0.11	-0.25
STUDREL.M	-0.12	-0.21	0.10	0.14	0.09	1.00	0.00	0.06	-0.15
DISCLIMA	0.11	0.16	0.15	0.20	-0.01	0.00	1.00	0.66	0.18
CLSMAN	0.05	0.04	0.36	0.39	0.11	0.06	0.66	1.00	0.03
MATH	0.47	0.63	-0.01	-0.15	-0.25	-0.15	0.18	0.03	1

Germany

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.54	0.04	-0.01	-0.10	-0.10	0.05	0.02	0.41
ESCS.M	0.54	1.00	-0.02	-0.09	-0.22	-0.20	0.09	0.02	0.60
COGACT	0.04	-0.02	1.00	0.62	0.37	0.11	0.16	0.38	0.05
TCHBEHTD	-0.01	-0.09	0.62	1.00	0.42	0.12	0.16	0.39	-0.06
TCHBEHSO	-0.10	-0.22	0.37	0.42	1.00	0.11	-0.04	0.13	-0.24
STUDREL.M	-0.10	-0.20	0.11	0.12	0.11	1.00	0.02	0.07	-0.15

DISCLIMA	0.05	0.09	0.16	0.16	-0.04	0.02	1.00	0.63	0.18
CLSMAN	0.02	0.02	0.38	0.39	0.13	0.07	0.63	1.00	0.09
MATH	0.41	0.60	0.05	-0.06	-0.24	-0.15	0.18	0.09	1

Greece

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.56	0.04	-0.02	-0.14	-0.12	0.10	0.08	0.39
ESCS.M	0.56	1.00	-0.01	-0.07	-0.24	-0.21	0.16	0.07	0.44
COGACT	0.04	-0.01	1.00	0.60	0.40	0.10	0.03	0.33	0.02
TCHBEHTD	-0.02	-0.07	0.60	1.00	0.35	0.15	0.11	0.38	-0.02
TCHBEHSO	-0.14	-0.24	0.40	0.35	1.00	0.12	-0.17	0.08	-0.36
STUDREL.M	-0.12	-0.21	0.10	0.15	0.12	1.00	0.06	0.11	-0.12
DISCLIMA	0.10	0.16	0.03	0.11	-0.17	0.06	1.00	0.48	0.22
CLSMAN	0.08	0.07	0.33	0.38	0.08	0.11	0.48	1.00	0.09
MATH	0.39	0.44	0.02	-0.02	-0.36	-0.12	0.22	0.09	1

Hungary

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.64	0.02	-0.03	-0.14	-0.07	0.15	0.06	0.48
ESCS.M	0.64	1.00	-0.03	-0.07	-0.26	-0.09	0.26	0.09	0.67
COGACT	0.02	-0.03	1.00	0.61	0.40	0.13	0.12	0.35	0.03
TCHBEHTD	-0.03	-0.07	0.61	1.00	0.39	0.19	0.19	0.40	-0.02
TCHBEHSO	-0.14	-0.26	0.40	0.39	1.00	0.11	-0.09	0.07	-0.29
STUDREL.M	-0.07	-0.09	0.13	0.19	0.11	1.00	0.07	0.08	-0.06
DISCLIMA	0.15	0.26	0.12	0.19	-0.09	0.07	1.00	0.60	0.28
CLSMAN	0.06	0.09	0.35	0.40	0.07	0.08	0.60	1.00	0.14
MATH	0.48	0.67	0.03	-0.02	-0.29	-0.06	0.28	0.14	1

Iceland

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.44	0.07	0.06	-0.01	0.13	0.00	0.03	0.27
ESCS.M	0.44	1.00	0.05	0.05	-0.07	0.29	0.01	0.00	0.23
COGACT	0.07	0.05	1.00	0.63	0.42	0.11	0.05	0.34	-0.01
TCHBEHTD	0.06	0.05	0.63	1.00	0.52	0.13	0.12	0.37	-0.02
TCHBEHSO	-0.01	-0.07	0.42	0.52	1.00	0.03	-0.05	0.10	-0.20
STUDREL.M	0.13	0.29	0.11	0.13	0.03	1.00	0.14	0.16	0.12
DISCLIMA	0.00	0.01	0.05	0.12	-0.05	0.14	1.00	0.55	0.12
CLSMAN	0.03	0.00	0.34	0.37	0.10	0.16	0.55	1.00	0.10
MATH	0.27	0.23	-0.01	-0.02	-0.20	0.12	0.12	0.10	1

Indonesia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.62	0.09	0.05	0.01	0.08	-0.08	-0.03	0.31
ESCS.M	0.62	1.00	0.08	0.04	-0.04	0.13	-0.09	-0.06	0.41
COGACT	0.09	0.08	1.00	0.46	0.43	0.16	-0.04	0.17	0.11
TCHBEHTD	0.05	0.04	0.46	1.00	0.45	0.16	0.05	0.25	0.09
TCHBEHSO	0.01	-0.04	0.43	0.45	1.00	0.12	-0.05	0.07	-0.14
STUDREL.M	0.08	0.13	0.16	0.16	0.12	1.00	0.01	0.14	0.09
DISCLIMA	-0.08	-0.09	-0.04	0.05	-0.05	0.01	1.00	0.19	0.05
CLSMAN	-0.03	-0.06	0.17	0.25	0.07	0.14	0.19	1.00	0.05
MATH	0.31	0.41	0.11	0.09	-0.14	0.09	0.05	0.05	1

Ireland

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.48	0.03	-0.02	-0.07	-0.03	0.09	0.08	0.38
ESCS.M	0.48	1.00	-0.04	-0.09	-0.14	-0.05	0.11	0.04	0.39
COGACT	0.03	-0.04	1.00	0.63	0.29	0.05	0.30	0.46	0.05
TCHBEHTD	-0.02	-0.09	0.63	1.00	0.34	0.10	0.29	0.46	-0.05
TCHBEHSO	-0.07	-0.14	0.29	0.34	1.00	0.09	-0.05	0.07	-0.21

STUDREL.M	-0.03	-0.05	0.05	0.10	0.09	1.00	0.03	0.03	0.00
DISCLIMA	0.09	0.11	0.30	0.29	-0.05	0.03	1.00	0.69	0.25
CLSMAN	0.08	0.04	0.46	0.46	0.07	0.03	0.69	1.00	0.14
MATH	0.38	0.39	0.05	-0.05	-0.21	0.00	0.25	0.14	1

Israel

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.53	0.05	-0.07	-0.12	-0.08	0.09	0.03	0.42
ESCS.M	0.53	1.00	-0.03	-0.12	-0.25	-0.15	0.07	0.01	0.54
COGACT	0.05	-0.03	1.00	0.61	0.39	0.07	0.19	0.39	0.07
TCHBEHTD	-0.07	-0.12	0.61	1.00	0.44	0.11	0.23	0.41	-0.07
TCHBEHSO	-0.12	-0.25	0.39	0.44	1.00	0.10	-0.07	0.09	-0.33
STUDREL.M	-0.08	-0.15	0.07	0.11	0.10	1.00	0.03	0.07	-0.18
DISCLIMA	0.09	0.07	0.19	0.23	-0.07	0.03	1.00	0.60	0.27
CLSMAN	0.03	0.01	0.39	0.41	0.09	0.07	0.60	1.00	0.15
MATH	0.42	0.54	0.07	-0.07	-0.33	-0.18	0.27	0.15	1

Italy

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.53	0.08	-0.04	-0.08	-0.13	0.08	0.03	0.32
ESCS.M	0.53	1.00	0.05	-0.11	-0.24	-0.23	0.15	0.04	0.48
COGACT	0.08	0.05	1.00	0.58	0.39	0.13	0.20	0.34	0.11
TCHBEHTD	-0.04	-0.11	0.58	1.00	0.49	0.20	0.20	0.36	-0.08
TCHBEHSO	-0.08	-0.24	0.39	0.49	1.00	0.19	-0.01	0.13	-0.27
STUDREL.M	-0.13	-0.23	0.13	0.20	0.19	1.00	0.02	0.09	-0.23
DISCLIMA	0.08	0.15	0.20	0.20	-0.01	0.02	1.00	0.57	0.20
CLSMAN	0.03	0.04	0.34	0.36	0.13	0.09	0.57	1.00	0.07
MATH	0.32	0.48	0.11	-0.08	-0.27	-0.23	0.20	0.07	1

Japan

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.49	0.11	0.08	0.04	0.15	0.11	0.10	0.31
ESCS.M	0.49	1.00	0.18	0.09	0.02	0.30	0.22	0.18	0.59
COGACT	0.11	0.18	1.00	0.58	0.42	0.14	0.09	0.18	0.15
TCHBEHTD	0.08	0.09	0.58	1.00	0.42	0.14	0.14	0.25	0.07
TCHBEHSO	0.04	0.02	0.42	0.42	1.00	0.04	-0.05	0.00	-0.11
STUDREL.M	0.15	0.30	0.14	0.14	0.04	1.00	0.16	0.12	0.23
DISCLIMA	0.11	0.22	0.09	0.14	-0.05	0.16	1.00	0.32	0.22
CLSMAN	0.10	0.18	0.18	0.25	0.00	0.12	0.32	1.00	0.13
MATH	0.31	0.59	0.15	0.07	-0.11	0.23	0.22	0.13	1

Jordan

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.49	0.08	0.06	0.02	-0.02	0.01	0.05	0.29
ESCS.M	0.49	1.00	0.06	0.01	-0.03	-0.02	0.00	0.00	0.36
COGACT	0.08	0.06	1.00	0.53	0.41	0.12	0.04	0.29	0.10
TCHBEHTD	0.06	0.01	0.53	1.00	0.64	0.15	0.17	0.29	0.05
TCHBEHSO	0.02	-0.03	0.41	0.64	1.00	0.13	0.01	0.06	-0.19
STUDREL.M	-0.02	-0.02	0.12	0.15	0.13	1.00	0.06	0.09	-0.02
DISCLIMA	0.01	0.00	0.04	0.17	0.01	0.06	1.00	0.31	0.20
CLSMAN	0.05	0.00	0.29	0.29	0.06	0.09	0.31	1.00	0.16
MATH	0.29	0.36	0.10	0.05	-0.19	-0.02	0.20	0.16	1

Kazakhstan

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	0.09	0.06	-0.05	0.01	0.13	0.13	0.28
ESCS.M	0.52	1.00	0.07	0.03	-0.13	0.01	0.10	0.14	0.31
COGACT	0.09	0.07	1.00	0.49	0.45	0.20	0.08	0.28	0.03

TCHBEHTD	0.06	0.03	0.49	1.00	0.41	0.24	0.21	0.36	0.06
TCHBEHSO	-0.05	-0.13	0.45	0.41	1.00	0.20	-0.01	0.08	-0.19
STUDREL.M	0.01	0.01	0.20	0.24	0.20	1.00	0.22	0.25	0.03
DISCLIMA	0.13	0.10	0.08	0.21	-0.01	0.22	1.00	0.42	0.20
CLSMAN	0.13	0.14	0.28	0.36	0.08	0.25	0.42	1.00	0.15
MATH	0.28	0.31	0.03	0.06	-0.19	0.03	0.20	0.15	1

Latvia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.57	0.07	-0.06	-0.04	-0.18	0.03	0.00	0.38
ESCS.M	0.57	1.00	0.01	-0.11	-0.13	-0.32	-0.01	-0.05	0.35
COGACT	0.07	0.01	1.00	0.55	0.41	0.14	0.11	0.34	0.04
TCHBEHTD	-0.06	-0.11	0.55	1.00	0.46	0.21	0.22	0.41	-0.08
TCHBEHSO	-0.04	-0.13	0.41	0.46	1.00	0.15	0.02	0.15	-0.22
STUDREL.M	-0.18	-0.32	0.14	0.21	0.15	1.00	0.15	0.23	-0.11
DISCLIMA	0.03	-0.01	0.11	0.22	0.02	0.15	1.00	0.55	0.12
CLSMAN	0.00	-0.05	0.34	0.41	0.15	0.23	0.55	1.00	0.05
MATH	0.38	0.35	0.04	-0.08	-0.22	-0.11	0.12	0.05	1

Lithuania

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	0.08	0.00	-0.09	0.06	0.09	0.09	0.37
ESCS.M	0.52	1.00	0.06	-0.03	-0.20	0.08	0.12	0.10	0.44
COGACT	0.08	0.06	1.00	0.56	0.34	0.10	0.09	0.27	0.03
TCHBEHTD	0.00	-0.03	0.56	1.00	0.40	0.10	0.16	0.29	-0.08
TCHBEHSO	-0.09	-0.20	0.34	0.40	1.00	-0.08	-0.12	-0.05	-0.28
STUDREL.M	0.06	0.08	0.10	0.10	-0.08	1.00	0.17	0.21	0.16
DISCLIMA	0.09	0.12	0.09	0.16	-0.12	0.17	1.00	0.58	0.25
CLSMAN	0.09	0.10	0.27	0.29	-0.05	0.21	0.58	1.00	0.17
MATH	0.37	0.44	0.03	-0.08	-0.28	0.16	0.25	0.17	1

Luxembourg

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	-0.02	-0.09	-0.10	-0.08	0.03	-0.05	0.42
ESCS.M	0.52	1.00	-0.01	-0.11	-0.17	-0.17	0.04	-0.05	0.53
COGACT	-0.02	-0.01	1.00	0.67	0.42	0.08	0.11	0.38	0.00
TCHBEHTD	-0.09	-0.11	0.67	1.00	0.45	0.09	0.11	0.39	-0.09
TCHBEHSO	-0.10	-0.17	0.42	0.45	1.00	0.15	-0.09	0.09	-0.29
STUDREL.M	-0.08	-0.17	0.08	0.09	0.15	1.00	0.02	0.03	-0.12
DISCLIMA	0.03	0.04	0.11	0.11	-0.09	0.02	1.00	0.60	0.17
CLSMAN	-0.05	-0.05	0.38	0.39	0.09	0.03	0.60	1.00	0.06
MATH	0.42	0.53	0.00	-0.09	-0.29	-0.12	0.17	0.06	1

Malaysia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.56	0.13	-0.05	-0.13	-0.14	0.07	0.00	0.37
ESCS.M	0.56	1.00	0.10	-0.11	-0.23	-0.26	0.09	-0.05	0.44
COGACT	0.13	0.10	1.00	0.43	0.31	0.04	0.00	0.22	0.11
TCHBEHTD	-0.05	-0.11	0.43	1.00	0.51	0.18	0.03	0.29	-0.08
TCHBEHSO	-0.13	-0.23	0.31	0.51	1.00	0.18	-0.12	0.09	-0.32
STUDREL.M	-0.14	-0.26	0.04	0.18	0.18	1.00	0.08	0.22	-0.13
DISCLIMA	0.07	0.09	0.00	0.03	-0.12	0.08	1.00	0.26	0.30
CLSMAN	0.00	-0.05	0.22	0.29	0.09	0.22	0.26	1.00	0.06
MATH	0.37	0.44	0.11	-0.08	-0.32	-0.13	0.30	0.06	1

Mexico

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.69	0.03	-0.05	-0.08	-0.10	-0.02	-0.03	0.32
ESCS.M	0.69	1.00	-0.01	-0.08	-0.15	-0.15	0.02	-0.03	0.38

COGACT	0.03	-0.01	1.00	0.60	0.48	0.17	0.00	0.28	-0.01
TCHBEHTD	-0.05	-0.08	0.60	1.00	0.54	0.20	0.09	0.34	-0.08
TCHBEHSO	-0.08	-0.15	0.48	0.54	1.00	0.15	-0.11	0.10	-0.21
STUDREL.M	-0.10	-0.15	0.17	0.20	0.15	1.00	0.07	0.18	-0.08
DISCLIMA	-0.02	0.02	0.00	0.09	-0.11	0.07	1.00	0.42	0.14
CLSMAN	-0.03	-0.03	0.28	0.34	0.10	0.18	0.42	1.00	0.01
MATH	0.32	0.38	-0.01	-0.08	-0.21	-0.08	0.14	0.01	1

Montenegro

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.45	0.01	-0.13	-0.06	-0.36	0.02	-0.07	0.36
ESCS.M	0.45	1.00	-0.07	-0.25	-0.23	-0.81	0.06	-0.08	0.54
COGACT	0.01	-0.07	1.00	0.57	0.45	0.11	0.01	0.29	-0.04
TCHBEHTD	-0.13	-0.25	0.57	1.00	0.55	0.27	0.13	0.38	-0.23
TCHBEHSO	-0.06	-0.23	0.45	0.55	1.00	0.27	-0.06	0.15	-0.28
STUDREL.M	-0.36	-0.81	0.11	0.27	0.27	1.00	-0.02	0.11	-0.46
DISCLIMA	0.02	0.06	0.01	0.13	-0.06	-0.02	1.00	0.45	0.16
CLSMAN	-0.07	-0.08	0.29	0.38	0.15	0.11	0.45	1.00	-0.04
MATH	0.36	0.54	-0.04	-0.23	-0.28	-0.46	0.16	-0.04	1

Netherlands

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.44	0.04	0.02	-0.08	0.02	0.00	0.03	0.34
ESCS.M	0.44	1.00	0.02	0.00	-0.23	0.01	0.08	0.04	0.61
COGACT	0.04	0.02	1.00	0.65	0.43	0.12	0.19	0.42	0.06
TCHBEHTD	0.02	0.00	0.65	1.00	0.42	0.13	0.24	0.44	0.04
TCHBEHSO	-0.08	-0.23	0.43	0.42	1.00	0.04	-0.02	0.13	-0.28
STUDREL.M	0.02	0.01	0.12	0.13	0.04	1.00	0.09	0.12	0.07
DISCLIMA	0.00	0.08	0.19	0.24	-0.02	0.09	1.00	0.62	0.15
CLSMAN	0.03	0.04	0.42	0.44	0.13	0.12	0.62	1.00	0.11

MATH	0.34	0.61	0.06	0.04	-0.28	0.07	0.15	0.11	1

New Zealand

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.50	0.08	-0.02	-0.11	0.10	0.16	0.12	0.42
ESCS.M	0.50	1.00	0.01	-0.07	-0.18	0.18	0.16	0.07	0.43
COGACT	0.08	0.01	1.00	0.63	0.41	0.15	0.19	0.44	0.07
TCHBEHTD	-0.02	-0.07	0.63	1.00	0.52	0.14	0.21	0.40	-0.03
TCHBEHSO	-0.11	-0.18	0.41	0.52	1.00	0.09	0.01	0.15	-0.22
STUDREL.M	0.10	0.18	0.15	0.14	0.09	1.00	0.13	0.13	0.06
DISCLIMA	0.16	0.16	0.19	0.21	0.01	0.13	1.00	0.57	0.30
CLSMAN	0.12	0.07	0.44	0.40	0.15	0.13	0.57	1.00	0.19
MATH	0.42	0.43	0.07	-0.03	-0.22	0.06	0.30	0.19	1

Norway

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.37	0.04	0.01	0.04	0.04	0.02	0.04	0.27
ESCS.M	0.37	1.00	0.00	-0.02	0.00	0.07	0.00	0.04	0.23
COGACT	0.04	0.00	1.00	0.69	0.51	0.18	0.13	0.41	0.07
TCHBEHTD	0.01	-0.02	0.69	1.00	0.56	0.18	0.15	0.37	0.01
TCHBEHSO	0.04	0.00	0.51	0.56	1.00	0.13	0.06	0.21	-0.09
STUDREL.M	0.04	0.07	0.18	0.18	0.13	1.00	0.12	0.14	0.10
DISCLIMA	0.02	0.00	0.13	0.15	0.06	0.12	1.00	0.53	0.15
CLSMAN	0.04	0.04	0.41	0.37	0.21	0.14	0.53	1.00	0.15
MATH	0.27	0.23	0.07	0.01	-0.09	0.10	0.15	0.15	1

Peru

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.69	0.02	-0.08	-0.08	-0.09	0.01	-0.06	0.48

ESCS.M	0.69	1.00	-0.05	-0.17	-0.19	-0.16	0.02	-0.11	0.58
COGACT	0.02	-0.05	1.00	0.60	0.49	0.16	0.03	0.32	-0.06
TCHBEHTD	-0.08	-0.17	0.60	1.00	0.54	0.21	0.10	0.34	-0.17
TCHBEHSO	-0.08	-0.19	0.49	0.54	1.00	0.14	-0.11	0.15	-0.25
STUDREL.M	-0.09	-0.16	0.16	0.21	0.14	1.00	0.06	0.20	-0.12
DISCLIMA	0.01	0.02	0.03	0.10	-0.11	0.06	1.00	0.37	0.10
CLSMAN	-0.06	-0.11	0.32	0.34	0.15	0.20	0.37	1.00	-0.11
MATH	0.48	0.58	-0.06	-0.17	-0.25	-0.12	0.10	-0.11	1

Poland

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	0.05	-0.06	-0.13	-0.12	0.00	0.00	0.41
ESCS.M	0.52	1.00	0.01	-0.10	-0.15	-0.21	-0.04	-0.08	0.39
COGACT	0.05	0.01	1.00	0.61	0.39	0.13	0.14	0.38	0.14
TCHBEHTD	-0.06	-0.10	0.61	1.00	0.51	0.22	0.19	0.40	-0.01
TCHBEHSO	-0.13	-0.15	0.39	0.51	1.00	0.12	0.00	0.17	-0.17
STUDREL.M	-0.12	-0.21	0.13	0.22	0.12	1.00	0.12	0.17	-0.06
DISCLIMA	0.00	-0.04	0.14	0.19	0.00	0.12	1.00	0.61	0.14
CLSMAN	0.00	-0.08	0.38	0.40	0.17	0.17	0.61	1.00	0.11
MATH	0.41	0.39	0.14	-0.01	-0.17	-0.06	0.14	0.11	1

Portugal

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.58	0.02	-0.05	-0.19	0.01	0.03	0.01	0.43
ESCS.M	0.58	1.00	-0.03	-0.11	-0.27	0.00	0.00	-0.04	0.40
COGACT	0.02	-0.03	1.00	0.68	0.40	0.14	0.15	0.40	0.01
TCHBEHTD	-0.05	-0.11	0.68	1.00	0.50	0.17	0.16	0.42	-0.07
TCHBEHSO	-0.19	-0.27	0.40	0.50	1.00	0.11	-0.05	0.12	-0.34
STUDREL.M	0.01	0.00	0.14	0.17	0.11	1.00	0.13	0.16	0.06
DISCLIMA	0.03	0.00	0.15	0.16	-0.05	0.13	1.00	0.62	0.15

CLSMAN	0.01	-0.04	0.40	0.42	0.12	0.16	0.62	1.00	0.06
MATH	0.43	0.40	0.01	-0.07	-0.34	0.06	0.15	0.06	1

Qatar

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	0.03	-0.02	-0.10	-0.07	0.07	0.03	0.24
ESCS.M	0.52	1.00	-0.03	-0.09	-0.25	-0.14	0.11	0.04	0.37
COGACT	0.03	-0.03	1.00	0.68	0.58	0.14	-0.08	0.34	0.02
TCHBEHTD	-0.02	-0.09	0.68	1.00	0.68	0.11	0.01	0.35	0.01
TCHBEHSO	-0.10	-0.25	0.58	0.68	1.00	0.10	-0.19	0.14	-0.27
STUDREL.M	-0.07	-0.14	0.14	0.11	0.10	1.00	0.06	0.15	0.09
DISCLIMA	0.07	0.11	-0.08	0.01	-0.19	0.06	1.00	0.36	0.26
CLSMAN	0.03	0.04	0.34	0.35	0.14	0.15	0.36	1.00	0.18
MATH	0.24	0.37	0.02	0.01	-0.27	0.09	0.26	0.18	1

Republic of Korea

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.47	0.09	0.04	-0.01	0.11	0.10	0.10	0.32
ESCS.M	0.47	1.00	0.09	0.03	-0.05	0.24	0.17	0.12	0.47
COGACT	0.09	0.09	1.00	0.64	0.50	0.18	0.16	0.34	0.08
TCHBEHTD	0.04	0.03	0.64	1.00	0.46	0.17	0.19	0.40	0.06
TCHBEHSO	-0.01	-0.05	0.50	0.46	1.00	0.08	-0.01	0.11	-0.21
STUDREL.M	0.11	0.24	0.18	0.17	0.08	1.00	0.21	0.22	0.26
DISCLIMA	0.10	0.17	0.16	0.19	-0.01	0.21	1.00	0.50	0.20
CLSMAN	0.10	0.12	0.34	0.40	0.11	0.22	0.50	1.00	0.14
MATH	0.32	0.47	0.08	0.06	-0.21	0.26	0.20	0.14	1

Romania

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH

ESCS	1.00	0.62	-0.01	-0.07	-0.16	-0.19	0.12	0.05	0.44
ESCS.M	0.62	1.00	-0.10	-0.14	-0.29	-0.28	0.18	0.06	0.52
COGACT	-0.01	-0.10	1.00	0.55	0.42	0.16	-0.04	0.23	-0.10
TCHBEHTD	-0.07	-0.14	0.55	1.00	0.41	0.20	0.08	0.29	-0.13
TCHBEHSO	-0.16	-0.29	0.42	0.41	1.00	0.03	-0.27	-0.07	-0.29
STUDREL.M	-0.19	-0.28	0.16	0.20	0.03	1.00	0.12	0.21	-0.14
DISCLIMA	0.12	0.18	-0.04	0.08	-0.27	0.12	1.00	0.45	0.26
CLSMAN	0.05	0.06	0.23	0.29	-0.07	0.21	0.45	1.00	0.10
MATH	0.44	0.52	-0.10	-0.13	-0.29	-0.14	0.26	0.10	1

Russian Federation

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.54	0.08	-0.05	-0.09	-0.09	0.06	0.07	0.33
ESCS.M	0.54	1.00	0.01	-0.15	-0.21	-0.21	0.03	0.03	0.30
COGACT	0.08	0.01	1.00	0.54	0.51	0.17	0.06	0.28	0.00
TCHBEHTD	-0.05	-0.15	0.54	1.00	0.48	0.24	0.17	0.33	-0.11
TCHBEHSO	-0.09	-0.21	0.51	0.48	1.00	0.21	0.00	0.12	-0.22
STUDREL.M	-0.09	-0.21	0.17	0.24	0.21	1.00	0.12	0.14	-0.06
DISCLIMA	0.06	0.03	0.06	0.17	0.00	0.12	1.00	0.43	0.17
CLSMAN	0.07	0.03	0.28	0.33	0.12	0.14	0.43	1.00	0.08
MATH	0.33	0.30	0.00	-0.11	-0.22	-0.06	0.17	0.08	1

Serbia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.50	0.00	-0.06	-0.11	-0.19	0.07	0.03	0.34
ESCS.M	0.50	1.00	-0.06	-0.15	-0.25	-0.38	0.16	0.01	0.54
COGACT	0.00	-0.06	1.00	0.59	0.47	0.16	-0.06	0.30	-0.04
TCHBEHTD	-0.06	-0.15	0.59	1.00	0.57	0.18	0.03	0.36	-0.14
TCHBEHSO	-0.11	-0.25	0.47	0.57	1.00	0.22	-0.08	0.20	-0.32
STUDREL.M	-0.19	-0.38	0.16	0.18	0.22	1.00	-0.05	0.09	-0.23

DISCLIMA	0.07	0.16	-0.06	0.03	-0.08	-0.05	1.00	0.49	0.22
CLSMAN	0.03	0.01	0.30	0.36	0.20	0.09	0.49	1.00	0.04
MATH	0.34	0.54	-0.04	-0.14	-0.32	-0.23	0.22	0.04	1

Shanghai China

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.59	0.17	0.04	0.00	0.27	0.14	0.14	0.39
ESCS.M	0.59	1.00	0.16	0.00	-0.13	0.47	0.20	0.17	0.56
COGACT	0.17	0.16	1.00	0.57	0.39	0.24	0.26	0.42	0.16
TCHBEHTD	0.04	0.00	0.57	1.00	0.43	0.16	0.23	0.39	-0.01
TCHBEHSO	0.00	-0.13	0.39	0.43	1.00	0.03	0.01	0.12	-0.24
STUDREL.M	0.27	0.47	0.24	0.16	0.03	1.00	0.27	0.30	0.32
DISCLIMA	0.14	0.20	0.26	0.23	0.01	0.27	1.00	0.54	0.31
CLSMAN	0.14	0.17	0.42	0.39	0.12	0.30	0.54	1.00	0.20
MATH	0.39	0.56	0.16	-0.01	-0.24	0.32	0.31	0.20	1

Singapore

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.51	0.05	0.03	-0.01	0.05	0.17	0.08	0.38
ESCS.M	0.51	1.00	0.02	-0.02	-0.05	0.11	0.18	0.04	0.47
COGACT	0.05	0.02	1.00	0.66	0.43	0.13	0.14	0.41	0.04
TCHBEHTD	0.03	-0.02	0.66	1.00	0.47	0.10	0.18	0.41	0.01
TCHBEHSO	-0.01	-0.05	0.43	0.47	1.00	0.06	-0.08	0.10	-0.20
STUDREL.M	0.05	0.11	0.13	0.10	0.06	1.00	0.06	0.11	0.11
DISCLIMA	0.17	0.18	0.14	0.18	-0.08	0.06	1.00	0.54	0.32
CLSMAN	0.08	0.04	0.41	0.41	0.10	0.11	0.54	1.00	0.17
MATH	0.38	0.47	0.04	0.01	-0.20	0.11	0.32	0.17	1

Slovakia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.61	-0.02	-0.11	-0.19	-0.21	0.13	0.02	0.49
ESCS.M	0.61	1.00	-0.09	-0.18	-0.30	-0.34	0.17	0.04	0.57
COGACT	-0.02	-0.09	1.00	0.55	0.44	0.14	-0.05	0.22	-0.07
TCHBEHTD	-0.11	-0.18	0.55	1.00	0.47	0.19	0.06	0.30	-0.15
TCHBEHSO	-0.19	-0.30	0.44	0.47	1.00	0.16	-0.16	0.06	-0.33
STUDREL.M	-0.21	-0.34	0.14	0.19	0.16	1.00	0.02	0.14	-0.19
DISCLIMA	0.13	0.17	-0.05	0.06	-0.16	0.02	1.00	0.48	0.21
CLSMAN	0.02	0.04	0.22	0.30	0.06	0.14	0.48	1.00	0.05
MATH	0.49	0.57	-0.07	-0.15	-0.33	-0.19	0.21	0.05	1

Slovenia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.55	0.14	-0.02	-0.09	-0.08	0.15	0.06	0.39
ESCS.M	0.55	1.00	0.13	-0.06	-0.26	-0.14	0.28	0.07	0.63
COGACT	0.14	0.13	1.00	0.53	0.27	0.12	0.06	0.28	0.14
TCHBEHTD	-0.02	-0.06	0.53	1.00	0.34	0.16	0.13	0.37	-0.03
TCHBEHSO	-0.09	-0.26	0.27	0.34	1.00	0.10	-0.20	0.02	-0.32
STUDREL.M	-0.08	-0.14	0.12	0.16	0.10	1.00	0.05	0.11	-0.05
DISCLIMA	0.15	0.28	0.06	0.13	-0.20	0.05	1.00	0.51	0.27
CLSMAN	0.06	0.07	0.28	0.37	0.02	0.11	0.51	1.00	0.07
MATH	0.39	0.63	0.14	-0.03	-0.32	-0.05	0.27	0.07	1

Spain

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.52	0.01	-0.03	-0.08	-0.02	0.08	0.03	0.38
ESCS.M	0.52	1.00	0.00	-0.03	-0.10	-0.05	0.08	0.03	0.31
COGACT	0.01	0.00	1.00	0.63	0.38	0.15	0.11	0.33	0.02
TCHBEHTD	-0.03	-0.03	0.63	1.00	0.43	0.16	0.14	0.33	-0.06
TCHBEHSO	-0.08	-0.10	0.38	0.43	1.00	0.09	-0.05	0.08	-0.25

STUDREL.M	-0.02	-0.05	0.15	0.16	0.09	1.00	0.09	0.15	0.01
DISCLIMA	0.08	0.08	0.11	0.14	-0.05	0.09	1.00	0.52	0.15
CLSMAN	0.03	0.03	0.33	0.33	0.08	0.15	0.52	1.00	0.05
MATH	0.38	0.31	0.02	-0.06	-0.25	0.01	0.15	0.05	1

Sweden

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.41	0.09	0.02	-0.01	0.05	0.08	0.11	0.32
ESCS.M	0.41	1.00	0.11	0.03	-0.02	0.10	0.13	0.08	0.27
COGACT	0.09	0.11	1.00	0.65	0.55	0.14	0.13	0.40	0.06
TCHBEHTD	0.02	0.03	0.65	1.00	0.60	0.14	0.17	0.40	-0.04
TCHBEHSO	-0.01	-0.02	0.55	0.60	1.00	0.07	0.06	0.23	-0.14
STUDREL.M	0.05	0.10	0.14	0.14	0.07	1.00	0.15	0.17	0.09
DISCLIMA	0.08	0.13	0.13	0.17	0.06	0.15	1.00	0.56	0.11
CLSMAN	0.11	0.08	0.40	0.40	0.23	0.17	0.56	1.00	0.11
MATH	0.32	0.27	0.06	-0.04	-0.14	0.09	0.11	0.11	1

Switzerland

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.46	0.02	-0.08	-0.12	0.00	0.02	-0.02	0.36
ESCS.M	0.46	1.00	-0.01	-0.10	-0.19	-0.01	0.01	-0.03	0.35
COGACT	0.02	-0.01	1.00	0.59	0.36	0.11	0.12	0.35	0.01
TCHBEHTD	-0.08	-0.10	0.59	1.00	0.44	0.14	0.20	0.36	-0.17
TCHBEHSO	-0.12	-0.19	0.36	0.44	1.00	0.22	0.01	0.10	-0.27
STUDREL.M	0.00	-0.01	0.11	0.14	0.22	1.00	0.12	0.12	0.05
DISCLIMA	0.02	0.01	0.12	0.20	0.01	0.12	1.00	0.62	0.14
CLSMAN	-0.02	-0.03	0.35	0.36	0.10	0.12	0.62	1.00	0.05
MATH	0.36	0.35	0.01	-0.17	-0.27	0.05	0.14	0.05	1

Thailand

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.65	0.07	0.00	-0.11	-0.09	-0.03	0.01	0.31
ESCS.M	0.65	1.00	0.05	-0.03	-0.20	-0.14	-0.03	0.00	0.42
COGACT	0.07	0.05	1.00	0.42	0.35	0.11	-0.15	0.19	0.00
TCHBEHTD	0.00	-0.03	0.42	1.00	0.55	0.18	0.04	0.27	-0.04
TCHBEHSO	-0.11	-0.20	0.35	0.55	1.00	0.19	-0.12	0.06	-0.26
STUDREL.M	-0.09	-0.14	0.11	0.18	0.19	1.00	0.02	0.16	-0.05
DISCLIMA	-0.03	-0.03	-0.15	0.04	-0.12	0.02	1.00	0.30	0.14
CLSMAN	0.01	0.00	0.19	0.27	0.06	0.16	0.30	1.00	0.07
MATH	0.31	0.42	0.00	-0.04	-0.26	-0.05	0.14	0.07	1

Tunisia

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.58	0.04	-0.05	-0.10	-0.25	-0.07	-0.05	0.35
ESCS.M	0.58	1.00	0.00	-0.10	-0.21	-0.42	-0.09	-0.10	0.49
COGACT	0.04	0.00	1.00	0.59	0.46	0.12	0.00	0.26	-0.03
TCHBEHTD	-0.05	-0.10	0.59	1.00	0.57	0.18	0.08	0.31	-0.15
TCHBEHSO	-0.10	-0.21	0.46	0.57	1.00	0.22	-0.01	0.15	-0.32
STUDREL.M	-0.25	-0.42	0.12	0.18	0.22	1.00	0.02	0.10	-0.30
DISCLIMA	-0.07	-0.09	0.00	0.08	-0.01	0.02	1.00	0.30	0.07
CLSMAN	-0.05	-0.10	0.26	0.31	0.15	0.10	0.30	1.00	-0.06
MATH	0.35	0.49	-0.03	-0.15	-0.32	-0.30	0.07	-0.06	1

Turkey

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.55	0.06	-0.02	-0.10	-0.06	0.07	0.06	0.38
ESCS.M	0.55	1.00	0.01	-0.06	-0.21	-0.12	0.14	0.10	0.59
COGACT	0.06	0.01	1.00	0.60	0.46	0.11	-0.03	0.30	0.03

TCHBEHTD	-0.02	-0.06	0.60	1.00	0.48	0.13	0.06	0.38	-0.02
TCHBEHSO	-0.10	-0.21	0.46	0.48	1.00	0.15	-0.11	0.07	-0.27
STUDREL.M	-0.06	-0.12	0.11	0.13	0.15	1.00	0.06	0.09	-0.12
DISCLIMA	0.07	0.14	-0.03	0.06	-0.11	0.06	1.00	0.38	0.22
CLSMAN	0.06	0.10	0.30	0.38	0.07	0.09	0.38	1.00	0.18
MATH	0.38	0.59	0.03	-0.02	-0.27	-0.12	0.22	0.18	1

United Arab Emirates

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.55	0.01	-0.02	-0.12	-0.12	0.09	0.03	0.32
ESCS.M	0.55	1.00	-0.05	-0.11	-0.27	-0.20	0.13	0.02	0.45
COGACT	0.01	-0.05	1.00	0.54	0.45	0.16	0.02	0.31	0.01
TCHBEHTD	-0.02	-0.11	0.54	1.00	0.58	0.21	0.16	0.28	-0.04
TCHBEHSO	-0.12	-0.27	0.45	0.58	1.00	0.20	-0.04	0.11	-0.30
STUDREL.M	-0.12	-0.20	0.16	0.21	0.20	1.00	0.09	0.14	-0.06
DISCLIMA	0.09	0.13	0.02	0.16	-0.04	0.09	1.00	0.38	0.23
CLSMAN	0.03	0.02	0.31	0.28	0.11	0.14	0.38	1.00	0.12
MATH	0.32	0.45	0.01	-0.04	-0.30	-0.06	0.23	0.12	1

United Kingdom

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.48	0.08	0.01	-0.06	0.09	0.10	0.06	0.36
ESCS.M	0.48	1.00	0.00	-0.09	-0.17	0.20	0.07	0.04	0.41
COGACT	0.08	0.00	1.00	0.64	0.41	0.13	0.27	0.44	0.11
TCHBEHTD	0.01	-0.09	0.64	1.00	0.44	0.10	0.30	0.44	0.01
TCHBEHSO	-0.06	-0.17	0.41	0.44	1.00	0.03	0.08	0.19	-0.15
STUDREL.M	0.09	0.20	0.13	0.10	0.03	1.00	0.14	0.16	0.16
DISCLIMA	0.10	0.07	0.27	0.30	0.08	0.14	1.00	0.64	0.27
CLSMAN	0.06	0.04	0.44	0.44	0.19	0.16	0.64	1.00	0.16
MATH	0.36	0.41	0.11	0.01	-0.15	0.16	0.27	0.16	1

United States

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.53	0.08	0.06	-0.06	0.18	0.14	0.11	0.39
ESCS.M	0.53	1.00	0.03	-0.01	-0.16	0.31	0.16	0.11	0.38
COGACT	0.08	0.03	1.00	0.60	0.36	0.13	0.09	0.37	0.04
TCHBEHTD	0.06	-0.01	0.60	1.00	0.43	0.15	0.19	0.39	0.01
TCHBEHSO	-0.06	-0.16	0.36	0.43	1.00	0.02	-0.09	0.05	-0.27
STUDREL.M	0.18	0.31	0.13	0.15	0.02	1.00	0.16	0.15	0.19
DISCLIMA	0.14	0.16	0.09	0.19	-0.09	0.16	1.00	0.47	0.28
CLSMAN	0.11	0.11	0.37	0.39	0.05	0.15	0.47	1.00	0.21
MATH	0.39	0.38	0.04	0.01	-0.27	0.19	0.28	0.21	1

Uruguay

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.65	-0.01	-0.11	-0.13	-0.31	0.09	-0.04	0.48
ESCS.M	0.65	1.00	-0.08	-0.17	-0.19	-0.46	0.10	-0.07	0.56
COGACT	-0.01	-0.08	1.00	0.64	0.47	0.15	-0.08	0.27	-0.07
TCHBEHTD	-0.11	-0.17	0.64	1.00	0.51	0.22	-0.02	0.31	-0.19
TCHBEHSO	-0.13	-0.19	0.47	0.51	1.00	0.17	-0.13	0.14	-0.27
STUDREL.M	-0.31	-0.46	0.15	0.22	0.17	1.00	0.01	0.17	-0.29
DISCLIMA	0.09	0.10	-0.08	-0.02	-0.13	0.01	1.00	0.43	0.21
CLSMAN	-0.04	-0.07	0.27	0.31	0.14	0.17	0.43	1.00	-0.02
MATH	0.48	0.56	-0.07	-0.19	-0.27	-0.29	0.21	-0.02	1

Viet Nam

Variables	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN	MATH
ESCS	1.00	0.67	0.13	0.04	-0.04	-0.18	-0.05	-0.02	0.38
ESCS.M	0.67	1.00	0.11	0.04	-0.12	-0.27	-0.07	-0.05	0.48

COGACT	0.13	0.11	1.00	0.52	0.47	0.05	0.07	0.24	0.12
TCHBEHTD	0.04	0.04	0.52	1.00	0.43	0.07	0.17	0.27	0.07
TCHBEHSO	-0.04	-0.12	0.47	0.43	1.00	0.16	0.10	0.19	-0.13
STUDREL.M	-0.18	-0.27	0.05	0.07	0.16	1.00	0.16	0.18	-0.23
DISCLIMA	-0.05	-0.07	0.07	0.17	0.10	0.16	1.00	0.38	0.07
CLSMAN	-0.02	-0.05	0.24	0.27	0.19	0.18	0.38	1.00	-0.03
MATH	0.38	0.48	0.12	0.07	-0.13	-0.23	0.07	-0.03	1

Table A3. Multicollinearity analysis for independent variables: Variance inflation factor (VIF) statistics

Education system	ESCS	ESCS.M	COGACT	TCHBEHTD	TCHBEHSO	STUDREL.M	DISCLIMA	CLSMAN
Argentina	1.56	1.92	1.66	1.78	1.53	1.39	1.21	1.38
Australia	1.41	1.61	2.02	2.05	1.32	1.22	1.74	2.15
Austria	1.46	1.59	1.81	1.81	1.38	1.05	1.84	2.01
Belgium	1.41	1.46	1.68	1.70	1.20	1.03	1.58	1.78
Brazil	1.78	1.84	1.86	1.90	1.55	1.07	1.28	1.45
Bulgaria	1.76	2.18	1.97	2.06	1.74	1.29	1.31	1.45
Canada	1.27	1.29	1.96	2.07	1.34	1.05	1.52	1.86
Chile	2.20	2.27	1.80	1.95	1.45	1.05	1.50	1.77
China, Hong Kong	1.52	1.55	1.86	2.00	1.28	1.05	1.51	1.84
China, Macao	1.39	1.44	1.80	1.84	1.26	1.04	1.38	1.53
Chinese Taipei	1.36	1.42	1.69	1.84	1.27	1.04	1.53	1.71
Colombia	1.72	1.77	1.62	1.77	1.48	1.09	1.25	1.40
Costa Rica	1.74	1.93	1.68	1.83	1.49	1.22	1.22	1.38
Croatia	1.36	1.52	1.55	1.75	1.34	1.10	1.56	1.73
Czech Republic	1.33	1.38	1.70	1.72	1.27	1.05	1.66	1.84
Denmark	1.24	1.30	1.80	1.89	1.33	1.09	1.60	1.84
Estonia	1.33	1.35	1.78	1.96	1.38	1.02	1.61	1.96
Finland	1.12	1.12	1.94	2.01	1.33	1.02	1.67	2.01
France	1.44	1.57	1.74	1.76	1.24	1.06	1.89	2.13
Germany	1.41	1.51	1.75	1.84	1.32	1.06	1.72	2.00
Greece	1.45	1.57	1.75	1.73	1.35	1.08	1.40	1.57
Hungary	1.68	1.85	1.75	1.83	1.36	1.05	1.71	1.88
Iceland	1.24	1.34	1.78	2.06	1.45	1.13	1.50	1.76
Indonesia	1.65	1.68	1.41	1.49	1.39	1.06	1.06	1.13
Ireland	1.31	1.34	1.80	1.88	1.20	1.02	1.93	2.29
Israel	1.41	1.48	1.74	1.88	1.40	1.03	1.61	1.86
Italy	1.40	1.56	1.65	1.85	1.45	1.10	1.53	1.67

Japan	1.32	1.49	1.65	1.69	1.32	1.13	1.17	1.19
Jordan	1.33	1.32	1.49	2.13	1.78	1.03	1.13	1.26
Kazakhstan	1.38	1.40	1.54	1.56	1.42	1.14	1.27	1.42
Latvia	1.49	1.60	1.60	1.76	1.36	1.19	1.46	1.72
Lithuania	1.37	1.43	1.57	1.69	1.35	1.07	1.55	1.69
Luxembourg	1.38	1.44	2.02	2.07	1.38	1.05	1.65	1.95
Malaysia	1.46	1.60	1.32	1.61	1.49	1.15	1.11	1.24
Mexico	1.91	1.96	1.71	1.94	1.58	1.08	1.26	1.42
Montenegro	1.26	3.24	1.61	2.00	1.58	3.00	1.31	1.49
Netherlands	1.25	1.32	1.95	1.97	1.40	1.03	1.66	1.99
New Zealand	1.37	1.42	1.87	2.04	1.47	1.07	1.55	1.82
Norway	1.16	1.16	2.12	2.21	1.54	1.06	1.42	1.70
Peru	1.92	2.01	1.74	1.90	1.58	1.08	1.21	1.37
Poland	1.39	1.44	1.73	2.01	1.42	1.10	1.64	1.94
Portugal	1.53	1.59	1.98	2.26	1.49	1.05	1.68	2.01
Qatar	1.37	1.48	2.10	2.57	2.22	1.05	1.26	1.41
Republic of Korea	1.29	1.38	1.95	1.93	1.45	1.13	1.37	1.57
Romania	1.62	1.82	1.61	1.66	1.53	1.19	1.38	1.43
Russian Federation	1.42	1.51	1.70	1.68	1.56	1.12	1.25	1.38
Serbia	1.34	1.58	1.68	1.97	1.63	1.20	1.45	1.63
Shanghai-China	1.56	1.92	1.77	1.70	1.35	1.40	1.45	1.69
Singapore	1.36	1.38	1.96	2.04	1.38	1.03	1.52	1.76
Slovakia	1.61	1.83	1.57	1.70	1.49	1.17	1.40	1.47
Slovenia	1.46	1.68	1.53	1.66	1.30	1.06	1.53	1.58
Spain	1.38	1.38	1.76	1.84	1.29	1.04	1.39	1.56
Sweden	1.22	1.24	1.98	2.13	1.72	1.05	1.50	1.79
Switzerland	1.28	1.30	1.66	1.78	1.37	1.07	1.67	1.90
Thailand	1.73	1.80	1.33	1.70	1.62	1.08	1.17	1.24
Tunisia	1.50	1.76	1.64	1.95	1.61	1.25	1.12	1.24
Turkey	1.44	1.52	1.73	1.86	1.50	1.05	1.22	1.43

United Arab Emirates	1.43	1.57	1.59	1.89	1.72	1.10	1.25	1.33
United Kingdom	1.32	1.39	1.88	1.93	1.32	1.07	1.71	1.99
United States of America	1.41	1.55	1.68	1.85	1.34	1.15	1.35	1.55
Uruguay	1.74	2.01	1.84	1.95	1.46	1.32	1.34	1.46
Viet Nam	1.81	1.93	1.61	1.51	1.44	1.14	1.20	1.28
Min	1.12	1.12	1.32	1.49	1.20	1.02	1.06	1.13
Mean	1.46	1.60	1.74	1.88	1.44	1.14	1.45	1.65
Max	2.20	3.24	2.12	2.57	2.22	3.00	1.93	2.29

Appendix B: Density distributions for independent and control variables

Figure B1. ESCS density distribution by education system

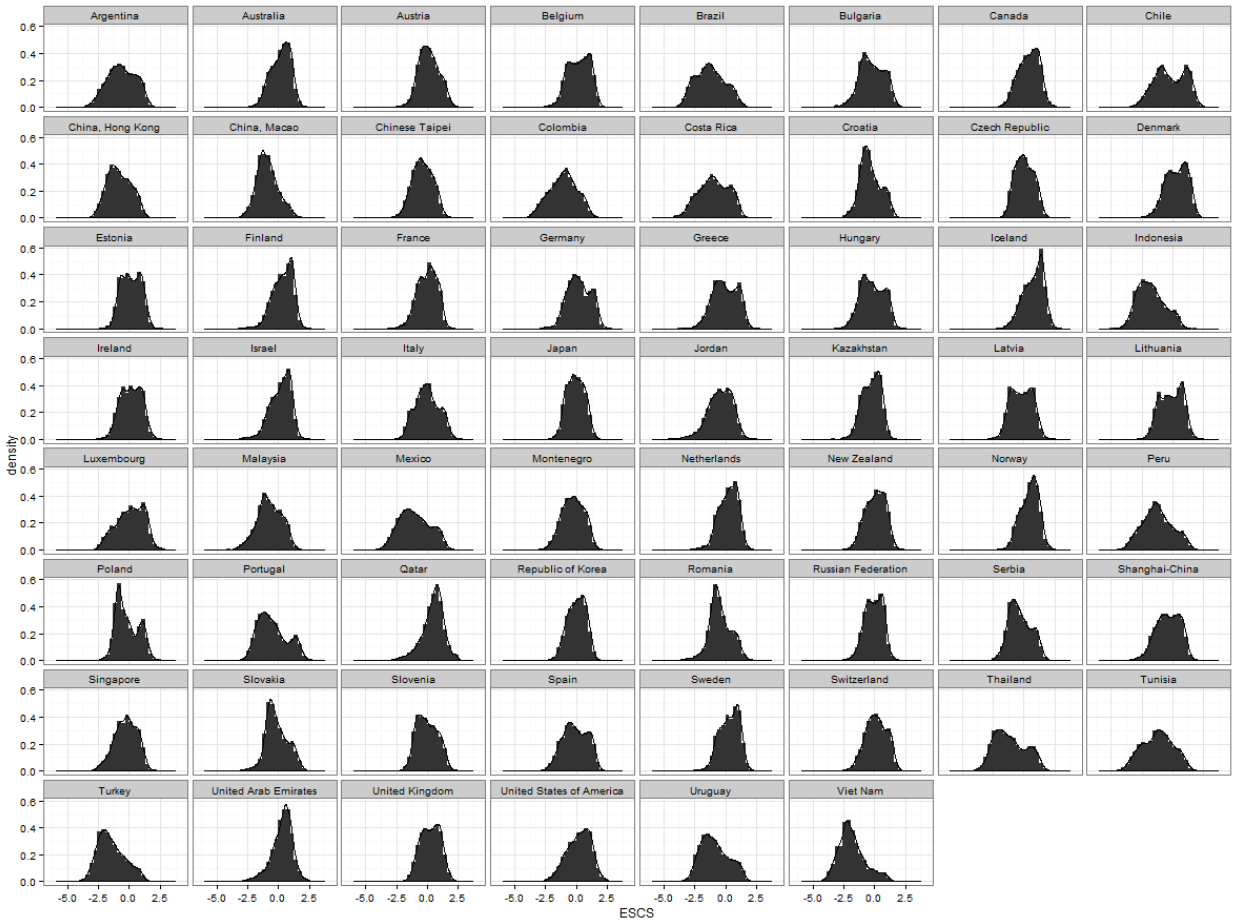


Figure B2. COGACT density distribution by education system

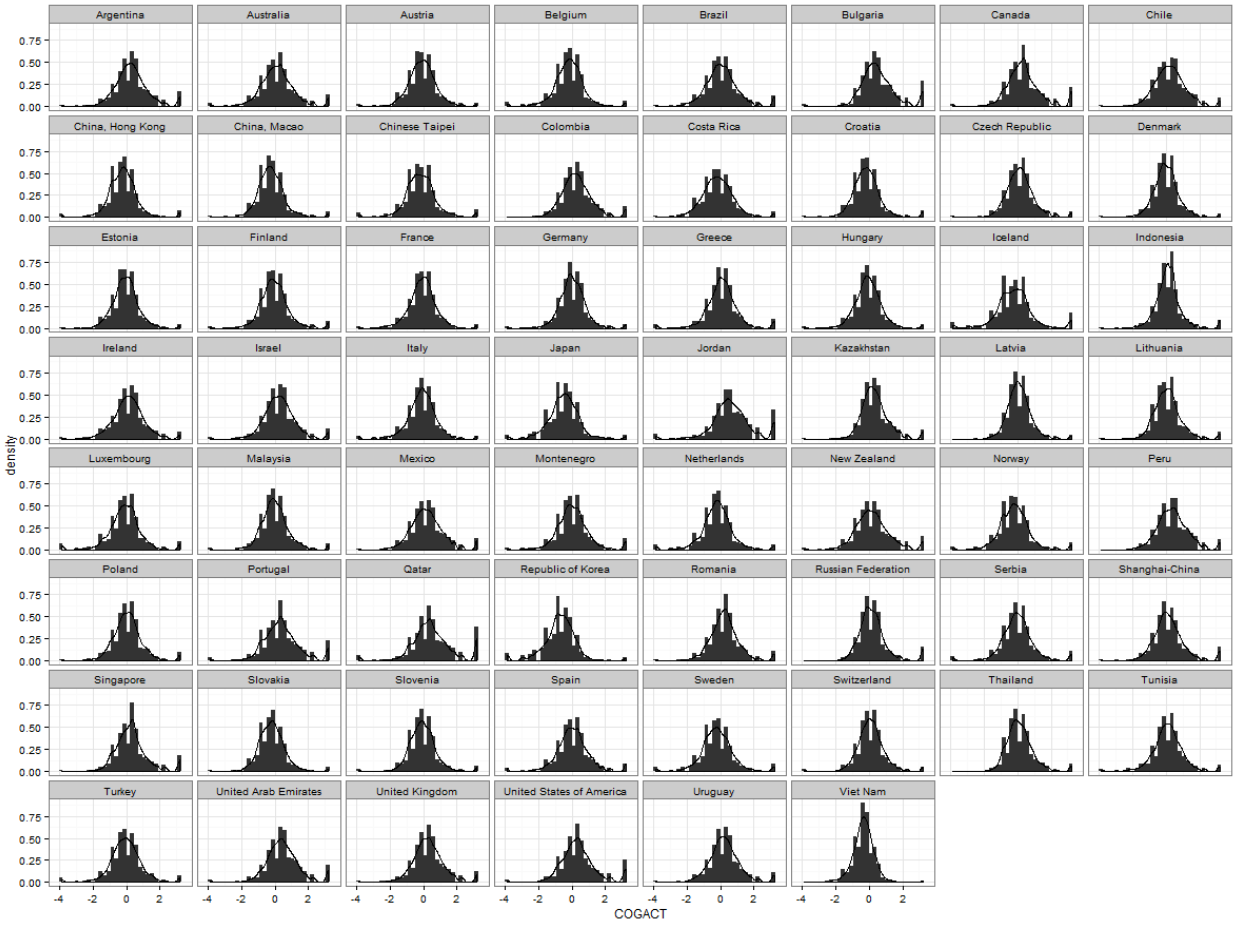


Figure B3. TCHBEHTD density distribution by education system

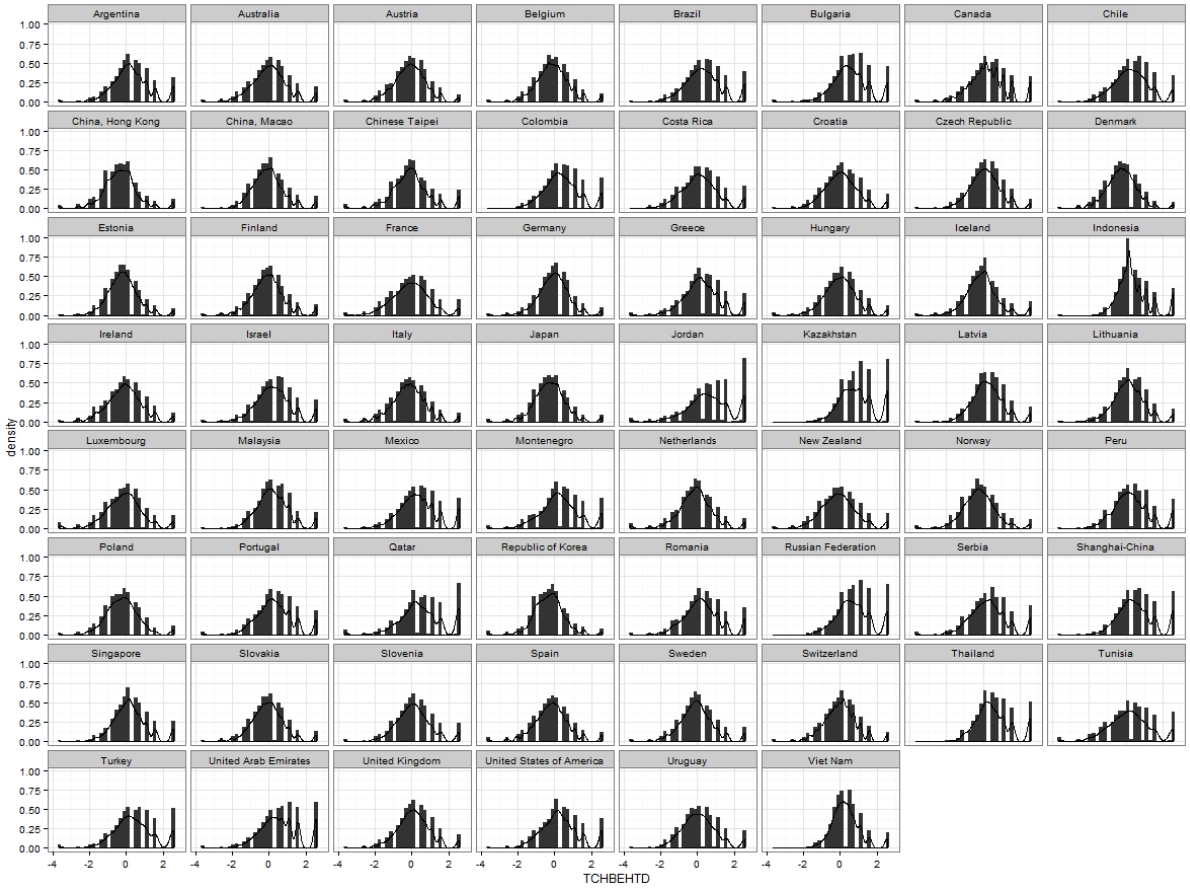


Figure B4. TCHBEHSO density distribution by education system

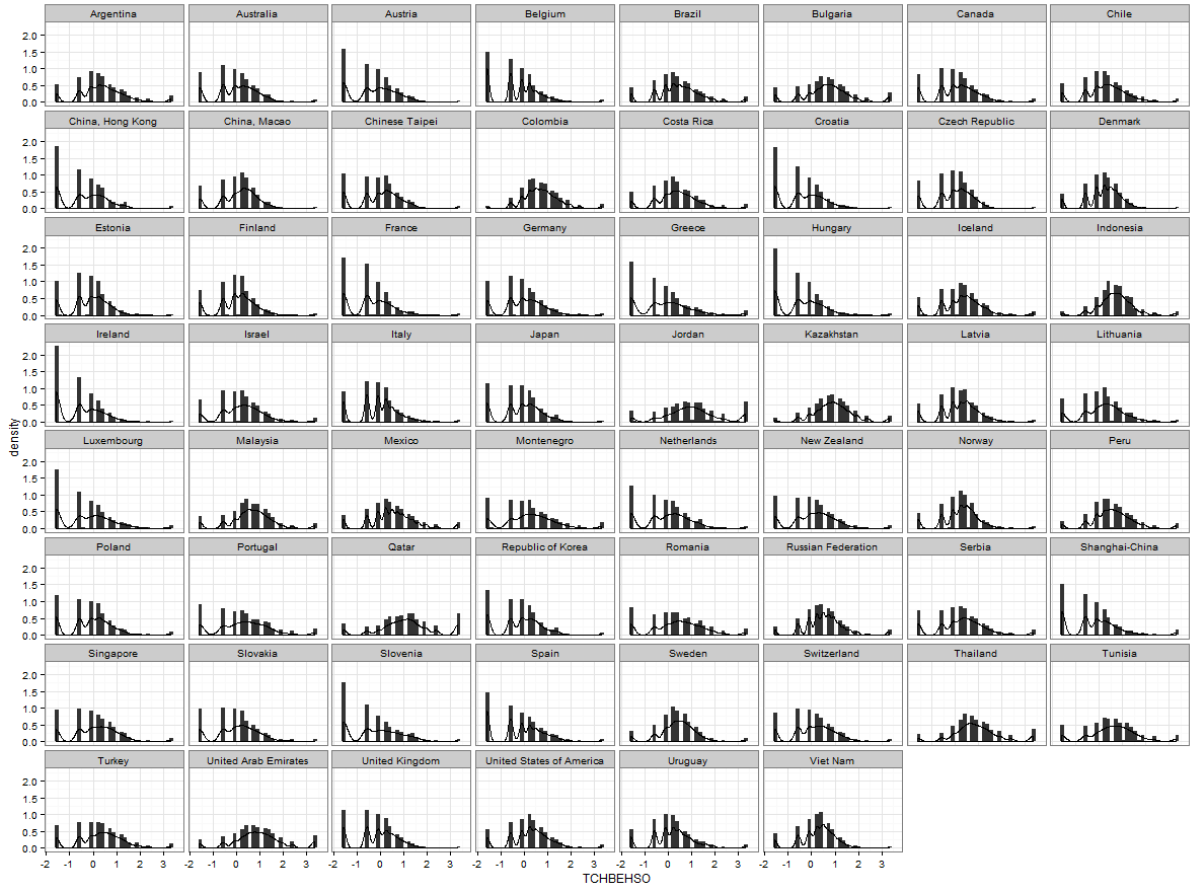


Figure B5. STUDREL.M density distribution by education system

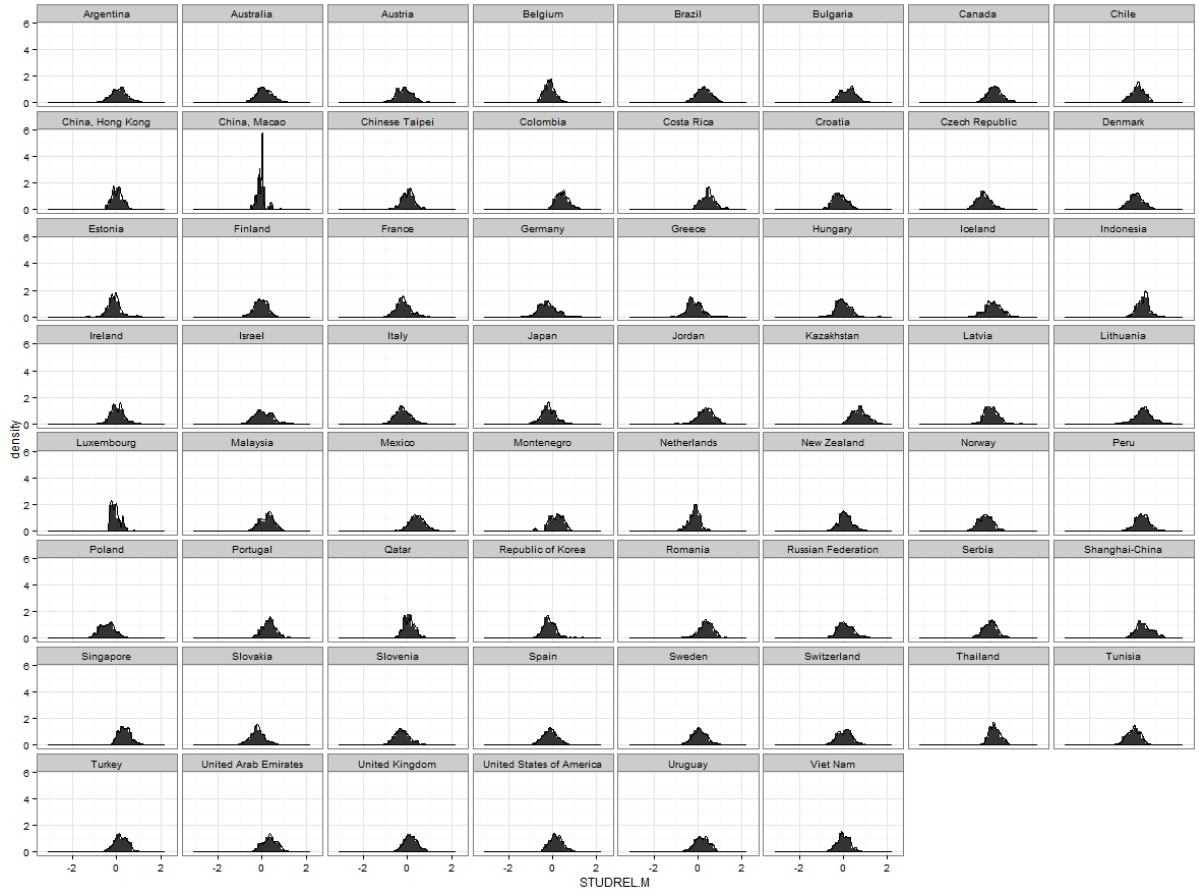


Figure B6. DISCLIMA density distribution by education system

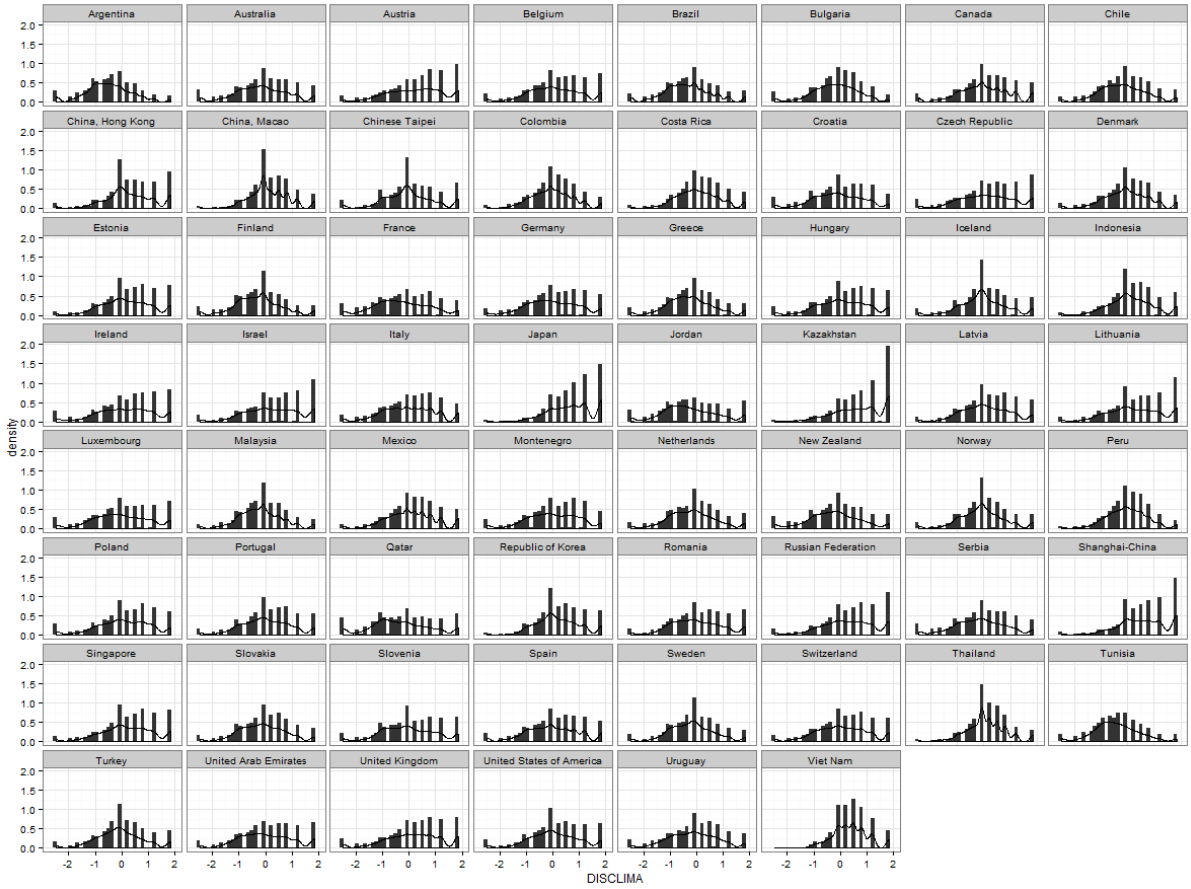
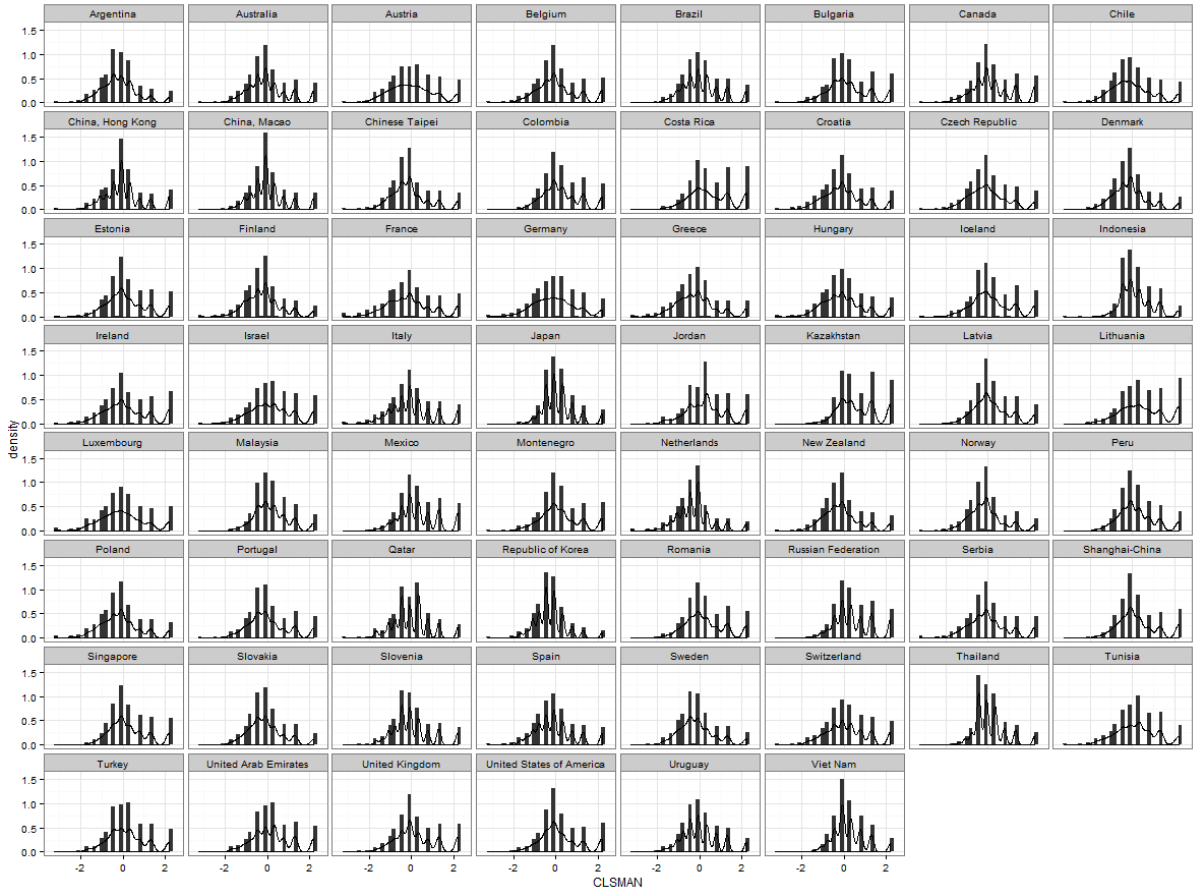


Figure B7. CLSMAN density distribution by education system



Appendix C: Regression Results

Table C1. Mathematics performance bivariate regressions on single instructional scales (unstandardised regression coefficients)

Education system	(1) COGACT		(2) TCHBEHTD		(3) TCHBEHSO		(4) STUDREL.M		(5) DISCLIMA		(6) CLSMAN	
Argentina	-5.84	*	-10.98	*	-19.75	*	-47.69	*	9.22	*	-4.89	*
Australia	11.36	*	10.27	*	-17.77	*	58.44	*	29.68	*	22.65	*
Austria	1.17		-7.85	*	-28.56	*	-5.74		14.56	*	8.50	*
Belgium	9.94	*	-8.00	*	-16.41	*	-20.34		20.57	*	13.30	*
Brazil	-5.81	*	-12.81	*	-23.57	*	-15.65	*	11.90	*	-2.16	
Bulgaria	-0.80		-3.87		-33.28	*	-58.75	*	25.80	*	10.26	*
Canada	5.38	*	3.65	*	-21.06	*	16.35	*	18.01	*	15.00	*
Chile	2.77		-10.51	*	-19.72	*	-2.04		8.19	*	0.75	
China, Hong Kong	8.59	*	2.05		-23.39	*	-2.79		14.06	*	9.71	*
China, Macao	0.58		0.30		-23.33	*	53.19	*	16.17	*	9.62	*
Chinese Taipei	13.26	*	-1.00		-34.43	*	62.53	*	26.71	*	14.59	*
Colombia	3.73		-7.74	*	-15.00	*	-31.35	*	11.65	*	-1.72	
Costa Rica	3.54		-9.92	*	-15.27	*	-49.76	*	7.06	*	0.09	
Croatia	4.55		-8.26	*	-21.16	*	-19.68		26.73	*	9.92	*
Czech Republic	-1.83		-7.94	*	-28.16	*	-1.14		20.32	*	10.90	*
Denmark	7.36	*	-6.68	*	-9.42	*	23.51	*	13.78	*	9.41	*
Estonia	1.57		-7.62	*	-16.60	*	7.07		16.84	*	7.10	*
Finland	5.36	*	3.30		-15.13	*	8.26		8.64	*	7.32	*
France	-1.49		-13.64	*	-25.63	*	-45.16	*	16.44	*	2.50	
Germany	5.86	*	-6.05	*	-24.55	*	-36.86	*	17.53	*	7.82	*
Greece	2.22		-1.64		-27.32	*	-30.10	*	21.64	*	7.77	*
Hungary	3.36		-1.80		-26.97	*	-18.04		25.15	*	12.19	*
Iceland	-0.68		-2.39		-19.57	*	29.40	*	12.40	*	9.54	*
Indonesia	9.27	*	7.11	*	-13.05	*	24.71		3.75		4.33	
Ireland	4.18	*	-4.70	*	-19.24	*	-0.54		19.57	*	10.83	*
Israel	7.49	*	-6.64	*	-34.89	*	-46.21	*	26.21	*	14.78	*
Italy	11.31	*	-7.19	*	-27.19	*	-59.08	*	17.92	*	6.47	*
Japan	14.67	*	7.54	*	-10.79	*	67.48	*	22.74	*	15.82	*
Jordan	6.10	*	3.06	*	-12.52	*	-3.72		14.35	*	12.40	*
Kazakhstan	2.21		4.41	*	-15.95	*	6.85		14.73	*	11.63	*
Latvia	4.57		-7.46	*	-20.77	*	-27.42	*	10.57	*	4.15	
Lithuania	3.46		-8.10	*	-26.28	*	35.50	*	21.06	*	14.22	*
Luxembourg	0.39		-8.26	*	-24.83	*	-55.72	*	15.18	*	4.70	*
Malaysia	10.09	*	-6.65	*	-27.45	*	-33.66	*	29.38	*	5.93	*
Mexico	-0.79		-5.76	*	-15.97	*	-16.90	*	11.33	*	0.53	
Montenegro	-3.45		-16.96	*	-20.77	*	-115.67	*	13.28	*	-3.19	
Netherlands	5.33	*	3.67		-25.07	*	25.61		15.48	*	10.88	*
New Zealand	6.20	*	-2.56		-22.27	*	18.25		29.79	*	19.76	*
Norway	6.61	*	0.57		-9.97	*	27.44	*	15.52	*	15.24	*
Peru	-5.54	*	-13.59	*	-23.86	*	-28.82	*	11.05	*	-10.24	*

Poland	13.57	*	-0.76		-16.11	*	-15.95		11.84	*	9.73	*
Portugal	0.61		-5.84	*	-28.21	*	17.19		14.53	*	5.18	*
Qatar	1.75		0.42		-23.04	*	32.40	*	23.06	*	19.57	*
Republic of Korea	8.24	*	6.22	*	-21.64	*	82.51	*	22.22	*	18.16	*
Romania	-8.39	*	-9.58	*	-20.03	*	-32.97	*	20.49	*	7.96	*
Russian Federation	0.08		-9.76	*	-22.17	*	-14.66		14.60	*	7.34	*
Serbia	-3.42		-11.75	*	-27.24	*	-62.70	*	19.65	*	3.77	
Shanghai-China	15.95	*	-1.26		-22.25	*	90.65	*	33.35	*	21.38	*
Singapore	4.57	*	1.43		-20.84	*	40.64	*	33.73	*	18.33	*
Slovakia	-9.07	*	-16.89	*	-33.99	*	-54.72	*	22.69	*	6.19	*
Slovenia	14.65	*	-2.44		-25.90	*	-11.42		23.46	*	7.04	*
Spain	1.86		-5.38	*	-21.06	*	1.86		13.60	*	4.27	*
Sweden	5.49	*	-3.75		-15.24	*	21.92	*	11.45	*	10.70	*
Switzerland	0.97		-16.78	*	-26.20	*	12.23		12.63	*	4.60	*
Thailand	0.09		-3.61	*	-23.91	*	-15.06		17.58	*	7.90	*
Tunisia	-2.03		-9.73	*	-23.74	*	-71.50	*	6.36	*	-4.46	*
Turkey	2.88		-1.44		-23.82	*	-35.18	*	21.76	*	17.08	*
United Arab Emirates	1.07		-3.41	*	-25.28	*	-13.84		19.74	*	10.48	*
United Kingdom	10.21	*	0.50		-14.09	*	45.29	*	23.04	*	14.53	*
United States of America	3.18	*	0.89		-25.49	*	53.40	*	25.32	*	18.72	*
Uruguay	-6.13	*	-16.94	*	-24.70	*	-74.95	*	19.01	*	-2.32	
Viet Nam	14.88	*	7.26	*	-13.30	*	-62.60	*	8.42	*	-3.18	
Positive	27		8		0		16		61		47	
Negative	6		34		62		23		0		3	
Non-significant	29		20		0		23		0		12	

* $p<0.05$

Table C2. Mathematics performance regressions on linear and quadratic terms of instructional scales (unstandardised regression coefficients)

Education system	(1)		(2)		(3)		(4)		(5)		(6)	
	COGACT	COGACT²	TCHBEHTD	TCHBEHTD²	TCHBEHSO	TCHBEHSO²	STUDRELM	STUDRELM²	DISCLIMA	DISCLIMA²	CLSMAN	CLSMAN²
Argentina	-3.28	-2.39 *	-9.21 *	-2.88 *	-18.60 *	-0.93	-55.58 *	15.70 *	9.31 *	0.10	-5.14 *	4.23 *
Australia	12.54 *	-3.36 *	10.62 *	-3.61 *	-17.51 *	-3.81 *	56.98 *	3.42	30.78 *	2.68 *	22.49 *	0.36
Austria	0.38	-2.80 *	-8.53 *	-2.66 *	-30.26 *	-5.95 *	-10.71	-32.62 *	14.24 *	3.17 *	7.76 *	3.01 *
Belgium	6.89 *	-5.62 *	-9.71 *	-7.82 *	-17.53 *	-9.62 *	-19.74	-54.24 *	20.52 *	-0.59	14.35 *	-2.03 *
Brazil	-4.53 *	-2.79 *	-10.51 *	-3.09 *	-21.65 *	-1.84 *	-1.65	-21.75 *	11.15 *	-1.33	-3.79 *	3.45 *
Bulgaria	4.03	-3.59 *	-0.36	-4.00 *	-34.22 *	0.62	-51.21 *	-12.96	23.48 *	-3.52 *	7.18 *	4.47 *
Canada	9.08 *	-3.94 *	5.46 *	-5.01 *	-19.18 *	-5.33 *	36.11 *	-28.17 *	17.88 *	-1.12	14.59 *	0.69
Chile	4.08 *	-2.02 *	-7.08 *	-4.36 *	-16.64 *	-3.56 *	10.28	-23.85	8.47 *	0.64	0.25	1.74
China, Hong Kong	8.32 *	-3.83 *	-0.57	-5.25 *	-23.65 *	-2.71 *	-7.00	46.02	14.34 *	-0.88	10.07 *	-1.05
China, Macao	0.95	-3.60 *	1.15	-3.77 *	-22.74 *	-4.10 *	65.60 *	-110.89 *	16.20 *	-0.19	10.65 *	-1.91
Chinese Taipei	12.24 *	-5.01 *	-1.36	-6.14 *	-33.74 *	-6.64 *	61.44 *	47.50	26.68 *	-0.47	14.82 *	-0.98
Colombia	6.57 *	-2.73 *	-6.13 *	-1.43	-8.16 *	-3.48 *	-13.77	-17.18	11.70 *	0.29	-4.98 *	3.32 *
Costa Rica	3.69	-2.32 *	-8.61 *	-2.60 *	-11.92 *	-3.49 *	-75.13 *	24.37	7.10 *	-0.76	-2.01	1.86
Croatia	5.72	-3.60 *	-7.38 *	-3.59 *	-22.18 *	-4.28 *	-17.55	12.52	28.18 *	3.44 *	9.68 *	1.25
Czech Republic	-0.19	-3.43 *	-7.24 *	-5.03 *	-28.14 *	-3.65 *	-3.40	-14.39	20.33 *	0.92	10.85 *	0.16
Denmark	7.48 *	-3.45 *	-9.06 *	-3.73 *	-8.45 *	-6.17 *	33.56 *	-23.59	13.94 *	1.38	9.95 *	-1.84
Estonia	1.65	-0.54	-7.80 *	-2.65 *	-19.09 *	-8.23 *	6.78	5.94	17.10 *	-0.91	6.84 *	0.38
Finland	6.02 *	-2.98 *	3.07	-2.94 *	-18.01 *	-11.64 *	6.19	-11.53	7.48 *	-1.84	7.35 *	-1.27
France	-2.47	-6.07 *	-14.11 *	-4.36 *	-28.00 *	-6.65 *	-64.04 *	-88.71 *	18.33 *	3.67 *	2.55	1.54
Germany	6.04 *	-3.74 *	-7.10 *	-6.96 *	-24.48 *	-5.88 *	-46.71 *	-42.23 *	17.48 *	-0.41	7.65 *	2.73 *
Greece	2.64	-3.77 *	-0.11	-4.39 *	-27.21 *	-0.34	-29.75 *	-10.48	21.41 *	-0.61	7.83 *	3.57 *
Hungary	2.64	-3.27 *	-2.92	-5.58 *	-28.08 *	-5.50 *	-19.26	-9.62	25.82 *	5.04 *	11.46 *	4.10 *
Iceland	-0.49	-2.37 *	-1.86	-5.81 *	-16.91 *	-3.41 *	25.58 *	8.37	11.84 *	-5.28 *	9.50 *	0.06
Indonesia	13.18 *	-4.33 *	10.20 *	-2.22	-11.02 *	-1.25	56.68	-37.03	6.24 *	-9.67 *	-3.64	9.66 *
Ireland	4.54 *	-1.22	-5.43 *	-3.74 *	-24.02 *	-7.04 *	1.86	-16.62	19.53 *	-0.49	10.99 *	-0.27
Israel	10.02 *	-3.44 *	-2.92	-7.60 *	-32.07 *	-4.27 *	-45.83 *	-0.85	26.92 *	-2.82	15.40 *	-1.12
Italy	9.91 *	-2.93 *	-9.07 *	-4.31 *	-26.49 *	-4.88 *	-58.96 *	2.18	18.27 *	1.95 *	6.23 *	1.55 *
Japan	10.78 *	-4.08 *	4.18	-6.95 *	-12.40 *	-7.60 *	60.28 *	-25.88	25.91 *	-3.75 *	23.82 *	-8.96 *
Jordan	8.22 *	-1.85 *	5.92 *	-3.27 *	-9.12 *	-1.62 *	-0.81	-4.31	13.35 *	-3.56 *	9.16 *	3.91 *
Kazakhstan	3.72	-1.06	8.70 *	-2.17 *	-17.17 *	0.61	3.30	2.16	16.12 *	-1.75	10.60 *	0.67
Latvia	6.29 *	-2.97	-6.28 *	-1.80	-18.07 *	-6.00 *	-26.09 *	-2.36	10.57 *	-0.05	2.22	2.38
Lithuania	6.69 *	-4.89 *	-6.79 *	-3.43 *	-24.75 *	-3.96 *	49.58 *	-17.59	20.87 *	0.57	11.22 *	2.89 *

Luxembourg	-0.74		-3.32	*	-10.35	*	-5.04	*	-24.69	*	-1.12		-79.45	*	325.31	*	15.36	*	1.16		4.55	*	1.68	
Malaysia	11.44	*	-3.74	*	-4.86	*	-3.04	*	-26.03	*	-1.18		-19.80		-35.42		28.07	*	-3.99	*	5.16		0.99	
Mexico	0.95		-1.96	*	-4.34	*	-1.74	*	-14.66	*	-0.98	*	-26.74	*	9.43		11.33	*	0.12		-2.95	*	3.83	*
Montenegro	-2.59		-1.99	*	-16.51	*	-0.98		-19.17	*	-2.43	*	-116.12	*	23.59	*	12.82	*	-1.57		-4.87	*	2.84	*
Netherlands	3.50		-3.34	*	1.78		-4.77	*	-24.61	*	-5.46	*	-24.11		-123.90		14.71	*	-3.96	*	10.83	*	-0.18	
New Zealand	9.24	*	-3.96	*	-2.22		-3.83	*	-20.12	*	-7.26	*	25.85		-18.42		30.65	*	1.60		19.13	*	2.40	*
Norway	6.01	*	-3.21	*	-1.88		-6.92	*	-5.44	*	-10.54	*	19.81	*	-24.30		14.84	*	-3.74	*	16.13	*	-3.14	*
Peru	-1.91		-2.95	*	-11.95	*	-1.69		-20.08	*	-2.54	*	-14.92		-16.09		10.55	*	-3.87	*	-17.84	*	8.99	*
Poland	14.11	*	-1.15		-1.62		-3.71	*	-15.77	*	-3.52	*	2.61		24.30	*	11.94	*	0.50		9.64	*	2.43	
Portugal	4.42	*	-3.57	*	-3.65		-4.83	*	-25.71	*	-3.21	*	24.37		-11.12		14.69	*	2.48		3.42		3.90	*
Qatar	5.18	*	-3.49	*	3.09	*	-4.07	*	-25.81	*	1.32	*	19.82	*	49.49	*	23.07	*	0.02		18.65	*	4.91	*
Republic of Korea	3.05		-3.33	*	2.45		-5.45	*	-22.22	*	-4.14	*	81.45	*	7.28		23.18	*	-2.41		18.16	*	0.21	
Romania	-5.98	*	-3.09	*	-7.75	*	-2.98	*	-19.69	*	-0.40		-10.92		-31.72		20.43	*	1.40		4.80	*	3.66	*
Russian Federation	6.84	*	-4.72	*	-3.41		-3.73	*	-20.26	*	-1.35		-11.09		-6.25		14.61	*	-0.03		8.02	*	-0.60	
Serbia	-3.06		-3.34	*	-9.92	*	-3.53	*	-25.33	*	-2.41	*	-55.93	*	-36.19		18.78	*	-2.01		3.26		1.90	
Shanghai-China	21.64	*	-5.69	*	4.45		-4.38	*	-22.57	*	0.88		77.85	*	12.15		34.37	*	-1.44		26.21	*	-5.15	*
Singapore	9.35	*	-3.88	*	5.60	*	-5.67	*	-19.58	*	-3.25	*	25.11	*	18.97		33.99	*	-1.80		19.05	*	-0.84	
Slovakia	-9.21	*	-3.82	*	-16.33	*	-6.61	*	-32.38	*	-5.65	*	-57.27	*	-22.47		21.85	*	-2.84		5.19	*	3.79	*
Slovenia	15.48	*	-4.14	*	-0.86		-4.75	*	-26.48	*	-5.24	*	-17.27	*	-48.66	*	23.47	*	1.93		6.47	*	1.03	
Spain	2.71		-2.94	*	-6.39	*	-4.11	*	-21.04	*	-4.19	*	-0.55		13.87		13.83	*	0.92		3.96	*	1.53	
Sweden	4.40	*	-3.52	*	-3.55	*	-7.14	*	-8.58	*	-6.60	*	20.25	*	4.72		10.73	*	-2.06		10.38	*	1.45	
Switzerland	1.45		-4.58	*	-17.36	*	-5.32	*	-24.44	*	-7.04	*	14.10		-11.07		12.70	*	-2.29		4.11	*	1.28	
Thailand	4.87	*	-4.85	*	3.67		-4.69	*	-28.64	*	2.17	*	-64.21	*	55.14	*	18.36	*	-8.83	*	2.01		6.93	*
Tunisia	-1.96		-0.51		-9.32	*	-1.45		-23.41	*	-0.29		-72.16	*	-5.16		6.59	*	0.36		-5.82	*	3.72	*
Turkey	2.42		-2.64	*	-0.18		-2.03	*	-23.17	*	-0.86		-37.63		5.31		21.84	*	0.45		12.91	*	6.02	*
United Arab Emirates	3.77	*	-2.77	*	0.85		-4.67	*	-23.95	*	-0.70		-24.41		13.84		19.62	*	-4.16	*	7.70	*	3.81	*
United Kingdom	14.57	*	-5.02	*	2.80		-7.30	*	-13.97	*	-7.22	*	49.88	*	-11.59		23.05	*	0.10		15.33	*	-1.27	
United States of America	7.02	*	-3.17	*	3.79	*	-3.68	*	-22.77	*	-3.68	*	71.75	*	-33.91	*	25.30	*	-0.73		19.31	*	-0.70	
Uruguay	-2.15		-6.18	*	-14.59	*	-5.90	*	-20.70	*	-5.02	*	-72.18	*	-5.90		17.94	*	-2.79	*	-2.82		1.50	
Viet Nam	14.23	*	-1.52		8.35	*	-1.01		-12.79	*	-1.14		-63.98	*	20.21		17.79	*	-12.42	*	-5.58		2.73	

* $p<0.05$

Table C3. Mathematics performance regressions on instructional approaches scales (unstandardised regression coefficients)

Education system	Intercept	COGACT	COGACT²	TCHBEHTD	TCHBEHTD²	TCHBEHSO	TCHBEHSO²	R-squared
Argentina	402.21 *	9.06 *	-1.65 *	-4.56	-1.39	-20.14 *	0.07	0.09 *
Australia	507.27 *	16.04 *	-1.53 *	12.39 *	-0.16	-30.25 *	-5.38 *	0.10 *
Austria	507.94 *	21.40 *	-0.97	-6.10 *	0.42	-36.07 *	-6.95 *	0.13 *
Belgium	533.18 *	23.90 *	-2.81 *	-15.78 *	-2.22 *	-19.22 *	-7.99 *	0.10 *
Brazil	407.62 *	12.50 *	-2.13 *	-7.67 *	-0.71	-24.25 *	-0.85	0.11 *
Bulgaria	464.06 *	14.55 *	-1.41	11.73 *	-1.25	-44.35 *	-0.16	0.20 *
Canada	525.37 *	12.69 *	-1.70 *	9.24 *	-2.00 *	-27.89 *	-5.16 *	0.11 *
Chile	436.46 *	21.93 *	-0.61	-10.79 *	-1.97 *	-19.47 *	-3.68 *	0.11 *
China, Hong Kong	564.68 *	17.79 *	-0.26	5.07	-1.87	-31.53 *	-4.09 *	0.11 *
China, Macao	551.76 *	8.06 *	-1.59	7.73 *	-1.35	-28.85 *	-4.95 *	0.07 *
Chinese Taipei	575.32 *	25.75 *	-2.44 *	1.56	-2.08	-42.57 *	-6.63 *	0.15 *
Colombia	394.38 *	18.62 *	-2.78 *	-9.84 *	0.79	-11.77 *	-2.72 *	0.06 *
Costa Rica	421.34 *	18.38 *	-0.72	-10.06 *	-0.11	-14.88 *	-3.30 *	0.10 *
Croatia	474.24 *	20.49 *	-2.53 *	-7.01 *	-0.54	-25.62 *	-4.38 *	0.09 *
Czech Republic	510.54 *	12.84 *	-2.39	-4.02	-2.53	-30.75 *	-2.33	0.08 *
Denmark	508.84 *	21.91 *	-1.91	-14.38 *	-1.40	-10.10 *	-4.61 *	0.04 *
Estonia	524.20 *	15.44 *	2.03	-5.23 *	-0.85	-23.73 *	-10.07 *	0.06 *
Finland	532.09 *	11.42 *	-1.09	7.59 *	-0.07	-26.94 *	-12.37 *	0.07 *
France	497.38 *	19.51 *	-3.07 *	-15.07 *	-1.46	-27.29 *	-5.50 *	0.10 *
Germany	528.65 *	22.13 *	0.10	-5.41	-3.62 *	-29.44 *	-5.77 *	0.10 *
Greece	452.70 *	16.11 *	-0.11	3.05	-1.80	-32.91 *	-1.38	0.17 *
Hungary	474.21 *	17.76 *	1.18	3.34	-2.55 *	-35.75 *	-6.32 *	0.13 *
Iceland	510.81 *	4.08	-0.96	9.22 *	-1.84	-23.57 *	-3.00	0.06 *
Indonesia	390.05 *	17.17 *	-3.37 *	13.50 *	-1.53	-21.96 *	-1.99	0.08 *
Ireland	494.64 *	14.07 *	-0.24	-6.47 *	-1.65	-25.78 *	-6.90 *	0.07 *
Israel	484.77 *	25.82 *	-0.67	-0.57	-4.58 *	-40.79 *	-3.80 *	0.17 *
Italy	494.41 *	28.66 *	-0.83	-7.55 *	-1.59 *	-33.71 *	-4.31 *	0.13 *

Japan	556.02	*	20.32	*	-1.01		3.31		-3.64	*	-23.41	*	-7.47	*	0.08	*				
Jordan	402.16	*	8.10	*	0.28		15.75	*	-2.21	*	-23.62	*	-0.70		0.11	*				
Kazakhstan	443.64	*	6.64	*	0.33		15.10	*	-2.72	*	-25.40	*	0.68		0.07	*				
Latvia	501.40	*	23.18	*	-1.08		-6.66	*	1.35		-22.90	*	-7.83	*	0.08	*				
Lithuania	489.34	*	20.11	*	-3.22	*	-4.29		-0.53		-28.11	*	-4.27	*	0.11	*				
Luxembourg	488.78	*	16.84	*	-1.06		-7.60	*	-2.22	*	-28.12	*	-0.44		0.11	*				
Malaysia	445.80	*	21.23	*	-2.69	*	3.21		-0.20		-33.56	*	-1.13		0.16	*				
Mexico	426.02	*	10.37	*	-1.38	*	-1.01		-0.36		-18.66	*	-0.75		0.06	*				
Montenegro	421.13	*	15.92	*	-1.81		-15.22	*	1.84	*	-17.07	*	-2.56	*	0.11	*				
Netherlands	540.11	*	14.94	*	-0.31		10.64	*	-0.80		-34.75	*	-6.76	*	0.16	*				
New Zealand	508.20	*	18.87	*	-2.54	*	3.94		1.70		-29.56	*	-8.40	*	0.11	*				
Norway	507.31	*	16.50	*	-0.58		-2.33		-2.19		-15.91	*	-9.02	*	0.06	*				
Peru	386.61	*	15.53	*	-3.41	*	-10.72	*	1.70		-21.54	*	-1.94		0.08	*				
Poland	519.56	*	25.20	*	0.24		-2.34		-1.10		-23.79	*	-4.22	*	0.09	*				
Portugal	499.79	*	15.56	*	-2.26	*	4.10		-0.65		-32.34	*	-3.40	*	0.17	*				
Qatar	420.72	*	13.43	*	-2.04	*	21.18	*	-2.28	*	-49.70	*	2.67	*	0.16	*				
Republic of Korea	577.04	*	26.75	*	2.29		10.96	*	-1.24		-40.34	*	-9.50	*	0.11	*				
Romania	456.29	*	6.84	*	-2.49	*	-2.82		-1.38		-21.14	*	0.79		0.09	*				
Russian Federation	502.93	*	22.80	*	-3.33	*	-5.65	*	-1.18		-24.82	*	-1.38		0.08	*				
Serbia	464.11	*	13.13	*	-1.29		-0.21		-1.41		-30.91	*	-1.74		0.12	*				
Shanghai-China	607.82	*	38.61	*	-5.22	*	-6.69		-0.10		-31.13	*	0.92		0.14	*				
Singapore	579.64	*	16.40	*	-2.54	*	7.73	*	-1.32		-28.02	*	-3.60	*	0.07	*				
Slovakia	498.11	*	14.46	*	-1.18		-4.81		-2.43		-35.14	*	-5.12	*	0.13	*				
Slovenia	506.52	*	28.08	*	-1.90		-2.33		-1.41		-31.71	*	-6.16	*	0.16	*				
Spain	487.66	*	14.34	*	-1.39		-2.26		-0.63		-25.07	*	-4.26	*	0.09	*				
Sweden	503.82	*	17.65	*	-0.42		-1.87		-3.92	*	-20.21	*	-4.79	*	0.07	*				
Switzerland	542.31	*	23.43	*	-1.71		-15.33	*	-1.59		-25.36	*	-6.58	*	0.12	*				
Thailand	453.80	*	11.49	*	-3.66	*	12.93	*	-2.18		-35.98	*	2.19	*	0.11	*				
Tunisia	406.40	*	13.49	*	-0.39		-1.84		-0.59		-28.38	*	0.08		0.13	*				
Turkey	461.76	*	15.19	*	-1.06		5.40	*	-1.16		-32.60	*	-0.63		0.11	*				

United Arab Emirates	460.23	*	10.65	*	-0.13		13.77	*	-3.36	*	-36.41	*	0.04		0.14	*
United Kingdom	502.21	*	23.83	*	-3.10	*	-3.91		-3.11	*	-20.78	*	-6.08	*	0.08	*
United States of America	494.40	*	9.83	*	-1.76	*	10.21	*	-1.32		-29.94	*	-3.95	*	0.10	*
Uruguay	424.48	*	14.92	*	-3.42	*	-12.46	*	-1.61		-20.54	*	-2.58	*	0.11	*
Viet Nam	527.56	*	26.56	*	-0.47		6.52		1.61		-25.57	*	-3.19	*	0.06	*

* $p<0.05$

Table C4. Mathematics performance regressions on instructional approaches (unstandardised regression coefficients)

	COGACT		TCHBEHTD		TCHBEHSO	
Argentina	7.12	*	-4.69		-20.58	*
Australia	15.03	*	11.86	*	-30.33	*
Austria	20.48	*	-6.6	*	-33.58	*
Belgium	25.9	*	-17.14	*	-18.6	*
Brazil	11.42	*	-7.76	*	-25.59	*
Bulgaria	12.39	*	11.47	*	-45.24	*
Canada	10.44	*	8.59	*	-29.6	*
Chile	21.34	*	-12.69	*	-22.5	*
China, Hong Kong	17.32	*	4.97		-30.98	*
China, Macao	7.19	*	6.7	*	-28.97	*
Chinese Taipei	26.55	*	0.05		-42.92	*
Colombia	15.37	*	-8.55	*	-17.3	*
Costa Rica	18.04	*	-10.9	*	-17.58	*
Croatia	18.7	*	-6.97	*	-24.48	*
Czech Republic	11.24	*	-3.78		-30.83	*
Denmark	21.77	*	-14.36	*	-10.56	*
Estonia	14.57	*	-7	*	-19.11	*
Finland	9.75	*	7.03	*	-22.85	*
France	19.26	*	-14.9	*	-25.76	*
Germany	21.83	*	-5.74		-29.27	*
Greece	16.18	*	2.09		-33.58	*
Hungary	17.38	*	2.69		-34.27	*
Iceland	4.25		7.91	*	-25.84	*
Indonesia	13.82	*	10.84	*	-25.08	*
Ireland	14.27	*	-6.98	*	-21.06	*
Israel	26.03	*	-3.55		-43.35	*
Italy	29.14	*	-6.95	*	-34.47	*

Japan	21.27	*	3.52		-21.47	*
Jordan	8.76	*	13.86	*	-25.45	*
Kazakhstan	7.44	*	9.48	*	-23.94	*
Latvia	20.06	*	-5.52		-25.41	*
Lithuania	16.94	*	-4.88		-29.58	*
Luxembourg	17.75	*	-6.56	*	-29.13	*
Malaysia	20.34	*	2.93		-35.07	*
Mexico	9.01	*	-1.05		-19.84	*
Montenegro	14.46	*	-14.2	*	-18.54	*
Netherlands	14.99	*	9.39	*	-34.79	*
New Zealand	16.67	*	1.82		-30.6	*
Norway	17.22	*	-3.87		-19.02	*
Peru	10.48	*	-8.41	*	-24.38	*
Poland	25.27	*	-3.25		-23.71	*
Portugal	12.21	*	4.34		-35	*
Qatar	11.96	*	21.19	*	-45.98	*
Republic of Korea	20.85	*	9.33	*	-36.27	*
Romania	5.13	*	-3.23		-20.78	*
Russian Federation	17.38	*	-6.56	*	-27.6	*
Serbia	13.06	*	-0.84		-32.67	*
Shanghai-China	32.86	*	-4.8		-32.01	*
Singapore	12.75	*	6.53	*	-29.15	*
Slovakia	13.66	*	-5.91		-36.27	*
Slovenia	27.11	*	-3.35		-30.83	*
Spain	13.65	*	-2.71		-24.94	*
Sweden	18.46	*	-3.08		-25.26	*
Switzerland	22.3	*	-16.09	*	-26.62	*
Thailand	8.09	*	11.22	*	-32.67	*
Tunisia	13.59	*	-1.96		-28.39	*
Turkey	15.62	*	4.75	*	-33.25	*

United Arab Emirates	11.14	*		10.8	*	-37.05	*
United Kingdom	20.77	*		-4.82		-21.08	*
United States of America	7.45	*		8.6	*	-32.49	*
Uruguay	12.92	*		-13.1	*	-23.76	*
Viet Nam	25.98	*		7.91	*	-26.63	*

* $p<0.05$

Table C5. Mathematics performance regressions on independent and control variables (unstandardised regression coefficients)

	ESCS		ESCS.M		COGACT		COGACT²		TCHBEHTD		TCHBEHTD²		TCHBEHSO		TCHBEHSO²		STUDREL.M		DISCLIMA		CLSMAN		R-squared	
Argentina	8.46	*	40.11	*	5.15	*	-1.15		-1.69		-0.90		-12.74	*	-0.30		-3.51		8.25	*	-1.40		0.30	*
Australia	22.36	*	43.52	*	8.96	*	-1.32	*	3.54	*	0.02		-20.99	*	-2.85	*	14.35	*	21.44	*	-0.18		0.29	*
Austria	15.47	*	68.44	*	12.66	*	-0.67		-6.44	*	-0.47		-21.01	*	-4.35	*	11.58		6.63	*	0.54		0.33	*
Belgium	19.17	*	82.93	*	10.94	*	-1.46		-10.10	*	-2.25	*	-8.64	*	-4.07	*	-4.29		11.14	*	1.48		0.38	*
Brazil	8.54	*	39.00	*	6.37	*	-1.27	*	-4.34	*	-0.37		-15.34	*	-0.82		2.08		9.05	*	-3.68	*	0.35	*
Bulgaria	13.56	*	51.87	*	6.82	*	-1.57	*	5.59	*	-0.60		-21.48	*	0.10		-2.35		13.60	*	0.20		0.44	*
Canada	19.36	*	35.27	*	8.83	*	-1.77	*	4.01	*	-1.34		-22.44	*	-3.68	*	4.26		10.21	*	4.34	*	0.22	*
Chile	8.61	*	41.69	*	12.25	*	-0.63		-7.28	*	-1.30		-10.10	*	-2.74	*	12.37		3.63	*	0.58		0.37	*
China, Hong Kong	4.72	*	60.76	*	13.26	*	-0.51		3.55		-1.92		-27.20	*	-3.12	*	22.19		9.21	*	-2.63		0.27	*
China, Macao	6.39	*	27.42	*	3.79		-1.43		5.03	*	-0.85		-26.24	*	-4.68	*	48.89	*	10.73	*	3.78		0.13	*
Chinese Taipei	26.70	*	98.80	*	13.46	*	-1.58	*	0.42		-0.60		-29.66	*	-5.12	*	30.24	*	11.71	*	-2.92		0.42	*
Colombia	10.19	*	29.94	*	12.21	*	-1.93		-8.00	*	0.86		-6.93	*	-1.63		-6.09		11.35	*	-4.06	*	0.27	*
Costa Rica	9.93	*	26.96	*	10.06	*	-0.89		-5.54	*	0.13		-9.48	*	-3.03	*	-7.51		6.87	*	-1.23		0.32	*
Croatia	12.97	*	73.72	*	12.97	*	-2.48	*	-5.93	*	-0.79		-15.46	*	-2.23		15.70		17.72	*	-2.28		0.35	*
Czech Republic	14.05	*	106.56	*	6.22	*	-0.67		-1.86		-3.07	*	-17.12	*	-1.76		1.10		12.84	*	-0.18		0.37	*
Denmark	31.48	*	30.44	*	14.77	*	-1.91		-12.80	*	-0.15		-9.81	*	-3.96	*	5.90		8.70	*	1.65		0.23	*
Estonia	18.95	*	34.98	*	11.81	*	1.53		-5.69	*	-0.65		-18.94	*	-9.25	*	8.22		14.32	*	0.29		0.19	*
Finland	25.85	*	16.92	*	7.86	*	-1.21		6.66	*	-0.35		-25.34	*	-10.85	*	3.12		4.09		1.93		0.14	*
France	20.24	*	99.00	*	9.75	*	-1.31		-6.23	*	-0.75		-13.28	*	-2.52	*	-2.27		11.03	*	-5.82	*	0.43	*
Germany	11.88	*	82.05	*	14.28	*	-0.05		-3.91		-2.81	*	-15.13	*	-2.36		-16.72	*	12.36	*	-2.22		0.40	*
Greece	16.99	*	39.78	*	11.10	*	-0.58		3.25		-1.46		-22.89	*	-0.17		-6.11		11.43	*	-2.64		0.33	*
Hungary	7.84	*	83.70	*	10.94	*	-0.25		1.73		-0.35		-16.86	*	-3.34	*	2.01		8.07	*	-0.86		0.50	*
Iceland	24.50	*	24.38	*	1.58		-0.92		3.70		-1.45		-18.96	*	-2.16		10.53	*	6.11	*	4.90	*	0.14	*
Indonesia	4.43	*	36.08	*	11.97	*	-2.65	*	11.22	*	-1.69		-18.18	*	-1.53		5.79		4.55	*	2.28		0.23	*
Ireland	23.82	*	45.43	*	8.47	*	-0.05		-7.51	*	-1.30		-15.69	*	-3.08	*	4.89		16.34	*	-2.82		0.27	*
Israel	19.68	*	78.00	*	16.80	*	-1.31		-3.05		-2.64	*	-25.02	*	-1.38		-14.62		18.13	*	0.74		0.41	*
Italy	6.61	*	62.74	*	19.13	*	-0.62		-3.45	*	-1.11	*	-20.84	*	-2.68	*	-29.38	*	10.14	*	-2.52	*	0.33	*
Japan	3.92		129.75	*	8.08	*	-0.71		1.92		-2.86	*	-18.09	*	-4.74	*	18.78	*	7.86	*	-1.93		0.37	*
Jordan	10.23	*	42.03	*	6.71	*	0.12		10.31	*	-1.67	*	-19.05	*	-0.89		-0.31		10.60	*	3.56	*	0.27	*
Kazakhstan	12.76	*	37.35	*	3.73		-0.66		8.79	*	-1.72		-19.21	*	0.89		1.89		9.51	*	1.54		0.18	*
Latvia	21.47	*	34.44	*	15.75	*	-1.91		-3.83		0.83		-17.83	*	-7.19	*	1.00		10.38	*	-1.71		0.25	*
Lithuania	17.21	*	54.62	*	10.78	*	-2.08	*	-8.49	*	0.01		-15.28	*	-2.02		21.51	*	14.13	*	-0.60		0.32	*
Luxembourg	14.74	*	60.70	*	10.17	*	-1.25	*	-2.65		-1.69	*	-19.57	*	0.48		-1.54		11.53	*	-2.08		0.37	*
Malaysia	12.02	*	35.53	*	13.83	*	-2.30	*	3.48		-1.16		-21.93	*	-0.83		-9.27		23.37	*	-0.02		0.35	*
Mexico	5.48	*	25.22	*	8.21	*	-1.52	*	-0.12		-0.41		-11.60	*	-1.30	*	-4.04		10.51	*	-3.45	*	0.21	*

Montenegro	11.10	*	70.71	*	10.71	*	-1.37		-6.82	*	1.12		-10.22	*	-1.42		-26.64	*	12.09	*	-3.35	*	0.38	*
Netherlands	8.60	*	120.18	*	8.45	*	-0.19		4.99	*	-1.07		-20.55	*	-3.16	*	21.11		8.67	*	-1.08		0.41	*
New Zealand	29.67	*	52.89	*	9.63	*	-2.19	*	-0.15		1.69		-17.70	*	-4.88	*	-8.20		17.20	*	4.99	*	0.33	*
Norway	24.04	*	42.98	*	11.84	*	-0.42		-4.47		-2.42		-16.55	*	-6.52	*	16.72	*	10.34	*	6.08	*	0.16	*
Peru	9.15	*	42.82	*	8.51	*	-1.91	*	-2.98		0.44		-11.73	*	-1.76		-2.19		9.67	*	-7.14	*	0.39	*
Poland	27.42	*	36.79	*	18.20	*	-0.45		-1.61		-1.30		-15.97	*	-3.93	*	-5.74		8.62	*	2.33		0.26	*
Portugal	21.23	*	22.80	*	9.60	*	-1.44	*	4.81		-1.38		-22.18	*	-2.93	*	15.52	*	11.80	*	-4.68		0.33	*
Qatar	7.84	*	59.28	*	8.59	*	-2.02	*	14.60	*	-2.39	*	-35.14	*	2.61	*	51.41	*	12.85	*	4.90	*	0.29	*
Republic of Korea	14.64	*	89.42	*	14.42	*	0.91		8.69	*	-0.98		-32.39	*	-6.13	*	43.26	*	7.48	*	-1.31		0.32	*
Romania	16.09	*	47.69	*	4.06	*	-2.18	*	-3.54	*	-0.62		-7.89	*	0.29		-3.98		10.86	*	0.98		0.34	*
Russian Federation	23.72	*	28.87	*	15.54	*	-2.92	*	-5.80	*	-0.96		-17.05	*	-1.66		5.51		12.14	*	0.20		0.19	*
Serbia	7.81	*	89.73	*	10.05	*	-0.34		1.00		-1.70	*	-19.10	*	-1.48		0.76		12.02	*	-2.17		0.38	*
Shanghai-China	9.57	*	68.64	*	16.67	*	-2.82	*	-2.28		-2.60		-20.07	*	0.84		10.35		19.89	*	-0.20		0.40	*
Singapore	18.82	*	72.52	*	10.99	*	-2.82	*	1.64		0.31		-21.09	*	-2.02		20.76	*	19.78	*	1.53		0.34	*
Slovakia	22.21	*	73.09	*	7.52	*	-2.39	*	-1.01		-1.36		-17.95	*	-3.26	*	5.46		9.22	*	-1.47		0.42	*
Slovenia	6.06	*	101.16	*	12.21	*	-1.14		1.80		-0.80		-15.81	*	-4.16	*	7.82		6.99	*	-4.82	*	0.47	*
Spain	23.78	*	22.56	*	11.70	*	-1.57	*	-2.36		-1.19	*	-20.34	*	-2.49	*	6.55		9.54	*	-3.57	*	0.25	*
Sweden	24.25	*	35.87	*	9.91	*	-1.21		-4.03		-3.29	*	-15.71	*	-3.66	*	10.76		4.58		5.04		0.17	*
Switzerland	19.61	*	54.74	*	18.37	*	-1.43		-14.89	*	-1.76		-19.70	*	-5.40	*	21.86	*	12.41	*	-2.06		0.28	*
Thailand	7.87	*	26.60	*	8.14	*	-2.01		8.97	*	-2.33	*	-24.04	*	0.76		4.39		15.61	*	0.70		0.23	*
Tunisia	7.47	*	32.10	*	10.24	*	-0.50		-0.71		-0.18		-18.24	*	-0.73		-28.58	*	11.05	*	-3.26	*	0.33	*
Turkey	4.71	*	73.28	*	8.48	*	-1.18		2.87		-1.07		-17.67	*	-0.63		-12.90		10.56	*	5.78	*	0.42	*
United Arab Emirates	11.56	*	53.40	*	9.33	*	-0.96		7.00	*	-2.40	*	-24.93	*	0.11		8.42		12.53	*	2.40		0.29	*
United Kingdom	23.10	*	58.35	*	12.73	*	-2.23	*	-6.00	*	-2.85	*	-10.98	*	-3.92	*	17.00	*	17.52	*	0.27		0.28	*
United States of America	19.19	*	29.87	*	4.54	*	-1.39	*	2.73		-1.44		-20.32	*	-2.44		18.61	*	13.74	*	6.54	*	0.29	*
Uruguay	12.99	*	42.96	*	9.87	*	-1.21		-6.55	*	-1.58		-12.13	*	-2.06		-3.57		12.93	*	-3.23		0.38	*
Viet Nam	6.16	*	45.88	*	14.98	*	0.05		7.03	*	-0.95		-13.43	*	-3.27	*	-26.85	*	15.92	*	-6.12	*	0.29	*

Table C6. Mathematics performance regression on instructional approaches and interactions (unstandardised regression coefficients for interaction effects)

Education system	Interactions with COGACT								Interactions with TCHBEHTD								Interactions with TCHBEHSO							
	ESCS		STUDRELM		DISCLIMA		CLSMAN		ESCS		STUDRELM		DISCLIMA		CLSMAN		ESCS		STUDRELM		DISCLIMA		CLSMAN	
Argentina	-0.75		-2.67		-3.12		1.68		0.08		5.98		6.77	*	-3.28		-1.36		-2.44		-0.57		1.28	
Australia	2.05		0.08		5.53	*	-2.95	*	-0.74		1.26		-0.11		-0.51		-1.49		-0.48		-2.15		1.94	
Austria	0.72		-9.19		2.19		-2.00		-1.29		-1.39		-1.44		0.72		4.98	*	-0.63		0.86		1.95	
Belgium	1.42		6.20		7.62	*	-4.29	*	0.08		-10.33		-2.22		-0.89		2.98		-6.36		0.37		1.04	
Brazil	1.89	*	-0.92		1.08		-0.13		-1.86	*	0.36		0.42		0.47		-2.31	*	-2.32		0.77		0.25	
Bulgaria	4.15		-6.96		0.11		1.11		-2.29		5.96		3.96	*	-4.02	*	-3.80	*	0.48		-1.60		0.96	
Canada	-1.52		-7.72		2.49		-2.00		0.42		1.55		1.57		-2.65		3.08	*	-2.00		0.94		0.67	
Chile	0.25		-5.68		2.99		0.54		0.11		-2.78		-1.23		-1.01		0.06		-2.78		0.27		-0.51	
China, Hong Kong	-3.76		-3.83		3.65		-1.27		2.37		5.37		-2.95		-2.93		-0.80		1.20		2.19		4.35	*
China, Macao	-3.57		-17.70		3.45		-3.24		1.12		-0.01		0.47		0.03		1.96		-14.07		6.85	*	-0.70	
Chinese Taipei	-1.01		12.34		3.47		-4.05	*	-2.08		-8.16		-2.12		1.62		4.78	*	-0.79		4.06		3.03	
Colombia	5.47	*	-0.77		3.30		0.65		-2.84	*	-6.29		-3.08		3.94	*	-4.45	*	-1.70		6.02	*	-3.26	
Costa Rica	3.68	*	-3.92		4.63	*	-2.08		-2.70		6.05		-3.26		1.43		-1.46		-1.71		-1.43		2.00	
Croatia	-0.70		8.42		5.36	*	-4.01		-0.45		-8.87		1.02		-0.46		3.99	*	-7.40		1.70		0.46	
Czech Republic	-0.14		9.49		8.84	*	-7.08	*	0.50		-15.51	*	-0.50		1.18		-0.09		-0.27		-1.83		2.09	
Denmark	-1.72		-7.25		3.39		1.68		-2.19		-0.18		1.78		-2.07		5.09		-1.27		2.38		-5.43	*
Estonia	-3.60		4.34		3.81		0.37		1.22		-13.95	*	4.05		-2.62		2.83		-1.21		2.75		-1.81	
Finland	-2.70		-8.74		4.77		-1.44		0.43		-0.64		4.17		-4.11		3.43		-9.66		1.36		-0.02	
France	-0.42		-6.07		2.26		-0.89		1.05		-1.67		1.20		-1.24		-0.59		0.17		0.43		1.13	
Germany	-0.53		-3.30		1.79		0.76		-1.16		-4.84		5.67	*	-6.00	*	2.48		0.04		1.25		2.26	
Greece	0.48		-4.50		4.94	*	-0.93		-0.83		0.88		1.55		-1.88		-0.20		5.61		-1.00		2.62	
Hungary	5.62	*	-4.42		3.89		-0.42		-1.70		-1.20		0.59		-1.02		1.14		2.75		-1.27		1.38	
Iceland	-1.38		1.18		4.54		-2.07		0.21		0.15		-3.06		-0.10		-4.98		6.43		2.03		-0.18	
Indonesia	0.25		-15.70	*	0.74		-1.23		-0.37		-2.28		-0.77		1.57		-3.19		4.54		2.83		1.81	
Ireland	-4.31	*	-6.35		2.29		-0.75		5.86	*	-7.62		5.27	*	-4.08		-1.39		3.62		-2.06		1.70	
Israel	-2.08		4.29		10.45	*	-1.86		-0.61		5.34		-4.80		-1.56		-0.06		-3.89		-4.76	*	1.89	
Italy	0.21		-9.00	*	3.54	*	2.05		1.77		3.85		-1.48		-2.46		0.16		8.64	*	2.12		-0.37	
Japan	5.58	*	-7.74		3.29		0.07		-3.77		-3.29		-6.49	*	-6.06	*	-0.57		9.31		3.40	*	3.98	
Jordan	1.22		-0.30		0.65		2.31	*	-0.68		-1.44		2.52	*	-1.44		-2.62	*	1.84		-1.09		0.40	
Kazakhstan	5.89	*	-2.98		1.97		1.96		-6.28	*	6.31		-2.02		0.81		-2.81		1.38		1.21		-4.99	*
Latvia	-0.28		3.08		8.16	*	-6.73		2.57		-1.98		-1.11		5.43		-3.49		-16.02		-0.41		2.33	
Lithuania	-1.67		-4.04		5.45	*	-0.75		-1.91		-11.54		-1.34		-1.02		0.91		10.58	*	-2.19		4.89	*

Luxembourg	0.29		-6.08		2.89		-1.29		0.36		11.93		2.07		-3.78		0.05		-9.12		-3.24		5.60	*
Malaysia	1.18		2.80		4.71	*	-0.47		0.32		-9.72		-3.76		-0.91		-4.94	*	10.52		2.45		4.15	
Mexico	-0.23		-0.39		3.16	*	-0.37		0.13		-0.55		-0.39		0.52		-0.82		2.21		1.29		1.19	
Montenegro	-1.94		-3.61		1.86		0.57		3.73		8.37		1.54		0.79		-2.58		-6.88		-0.76		-0.58	
Netherlands	-2.98		2.33		1.62		0.25		2.91		-7.18		0.50		-2.21		0.37		-0.58		2.67		1.45	
New Zealand	0.98		-12.62		1.88		-0.32		1.37		-8.89		-1.81		-0.63		2.45		1.21		2.72		-0.86	
Norway	-0.70		-5.70		0.55		1.43		1.88		6.81		2.58		-6.31	*	-4.10		-24.21	*	1.43		2.61	
Peru	2.20		-2.71		0.69		1.70		-2.70	*	4.65		1.15		-0.05		-1.06		-5.60		-0.30		0.41	
Poland	-1.76		12.89		3.29		-0.43		1.34		1.67		1.74		-2.43		0.43		-1.20		2.11		1.10	
Portugal	-0.03		4.71		-2.13		-1.86		2.28		-0.72		5.24	*	-4.38		1.50		-9.71		0.75		2.66	
Qatar	2.46		-5.17		1.58		0.39		1.42		3.36		3.52	*	-6.10	*	-7.08	*	-2.32		-4.60	*	2.77	
Republic of Korea	3.79		4.62		5.94	*	-4.46		-3.70		-6.19		3.24		-4.37		-0.51		12.44		1.54		3.00	
Romania	0.09		0.81		3.16	*	-2.32		-1.21		-1.80		2.33		2.29		-3.67		-1.47		-2.94	*	1.06	
Russian Federation	1.50		-3.30		0.66		-0.68		-0.94		-6.69		0.39		0.64		-4.13		2.10		0.84		-1.14	
Serbia	0.99		-5.81		5.44	*	-0.08		0.15		14.11	*	1.40		-4.59	*	0.64		-10.57		-2.76		3.24	
Shanghai-China	-3.57		5.34		1.79		1.02		2.36		-14.18	*	-2.96		-2.47		-0.23		2.84		3.12		1.42	
Singapore	-0.55		-3.46		1.12		-4.03		0.00		-9.85		2.51		-0.83		3.29		-0.68		-0.68		2.93	
Slovakia	0.38		-8.04		5.31		4.72		-0.97		-2.76		2.58		-3.74		-1.93		-3.80		-1.34		3.44	
Slovenia	2.89		-2.41		0.63		-1.21		-0.59		-3.81		3.01		-3.40		-3.59	*	-2.45		1.64		3.81	
Spain	0.39		-0.91		2.52		0.16		1.85		-1.83		1.15		-2.76	*	0.50		-1.01		-0.48		2.16	
Sweden	1.70		1.85		7.44	*	-1.49		3.93		-2.50		-2.58		-3.37		-5.82	*	-1.18		-0.70		2.13	
Switzerland	1.09		-1.66		4.89		-1.39		-0.39		9.23		-0.55		-2.78		0.70		-14.02	*	-0.98		3.35	
Thailand	1.03		1.70		2.95		-0.05		-2.21		17.49	*	-0.92		-2.60		-1.49		-0.97		-3.52		4.87	*
Tunisia	1.45		-8.03		-0.26		1.14		0.41		1.58		2.82		0.23		-3.52	*	4.02		-1.11		0.56	
Turkey	3.14	*	-1.97		0.00		-0.76		-1.82		0.14		2.01		-2.96	*	-3.16	*	14.32	*	-0.49		2.19	
United Arab Emirates	3.01	*	-9.21	*	4.93	*	2.19		-0.82		3.08		-1.67		-2.29		-5.11	*	1.44		-1.34		3.29	*
United Kingdom	-0.10		2.46		0.72		-2.92		-5.32	*	-8.47		0.77		-2.70		4.59	*	-6.34		0.06		2.54	
United States of America	-1.58		4.80		2.01		0.16		0.71		-14.85	*	-0.69		-3.14		0.48		11.14		1.22		0.22	
Uruguay	-2.18		2.48		2.53		-2.66		4.28	*	-1.17		1.89		-1.31		1.05		-1.05		0.60		1.65	
Viet Nam	-3.01		1.67		1.28		1.71		-3.89		14.32		-1.28		6.72	*	4.21	*	-3.19		4.69		-4.82	
Positive (%)	13%		0%		27%		6%		3%		3%		11%		3%		10%		5%		5%		8%	
Negative (%)	2%		5%		0%		2%		8%		6%		2%		13%		16%		3%		5%		3%	
Non-significant (%)	85%		95%		73%		92%		89%		90%		87%		84%		74%		92%		90%		89%	

* $p<0.05$

Appendix D: Curvilinear associations with independent and control variables

Figure D1. Regression of MATH on linear and quadratic term of TCHBEHTD

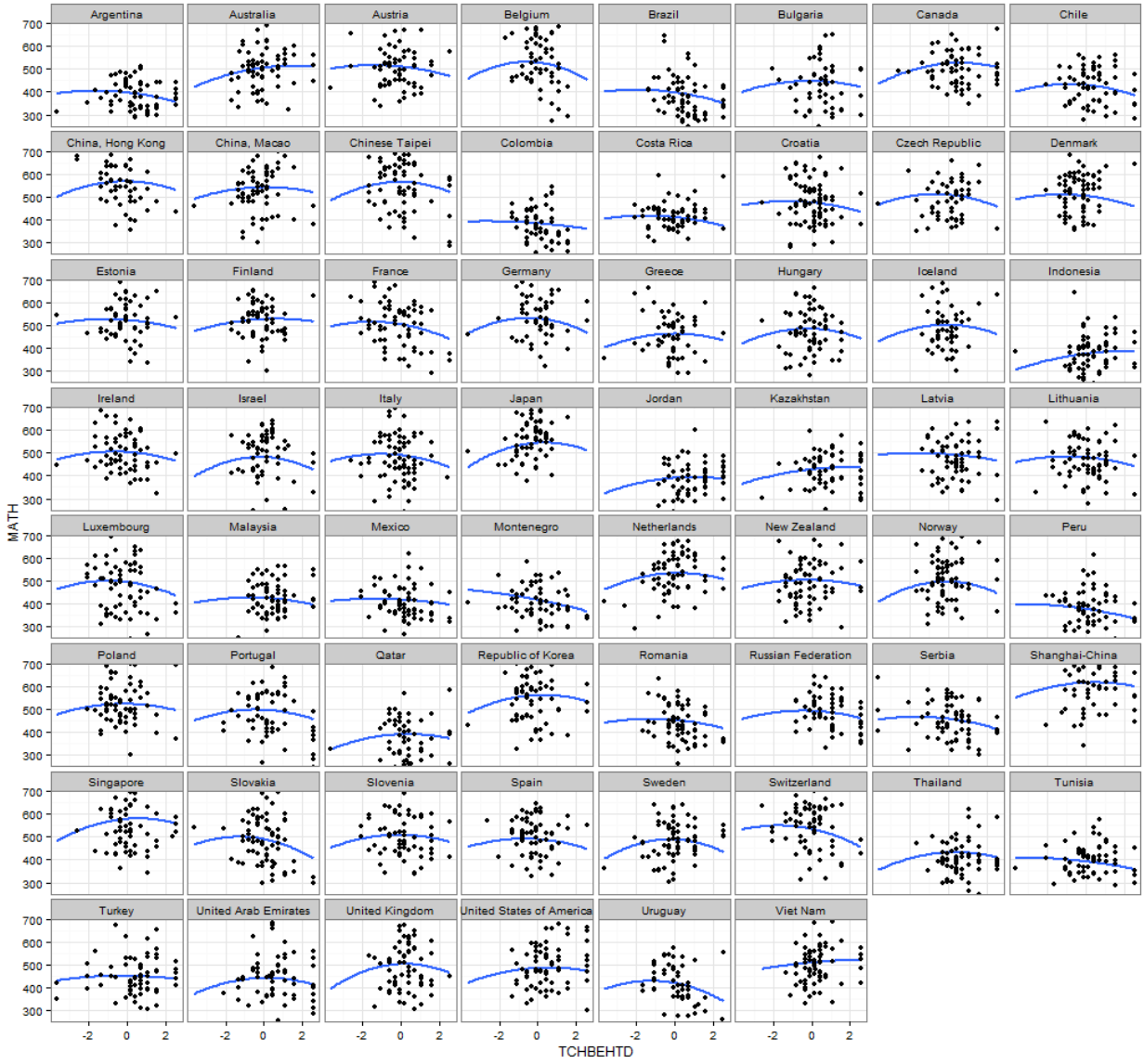


Figure D2. Regression of MATH on linear and quadratic term of TCHBEHSO

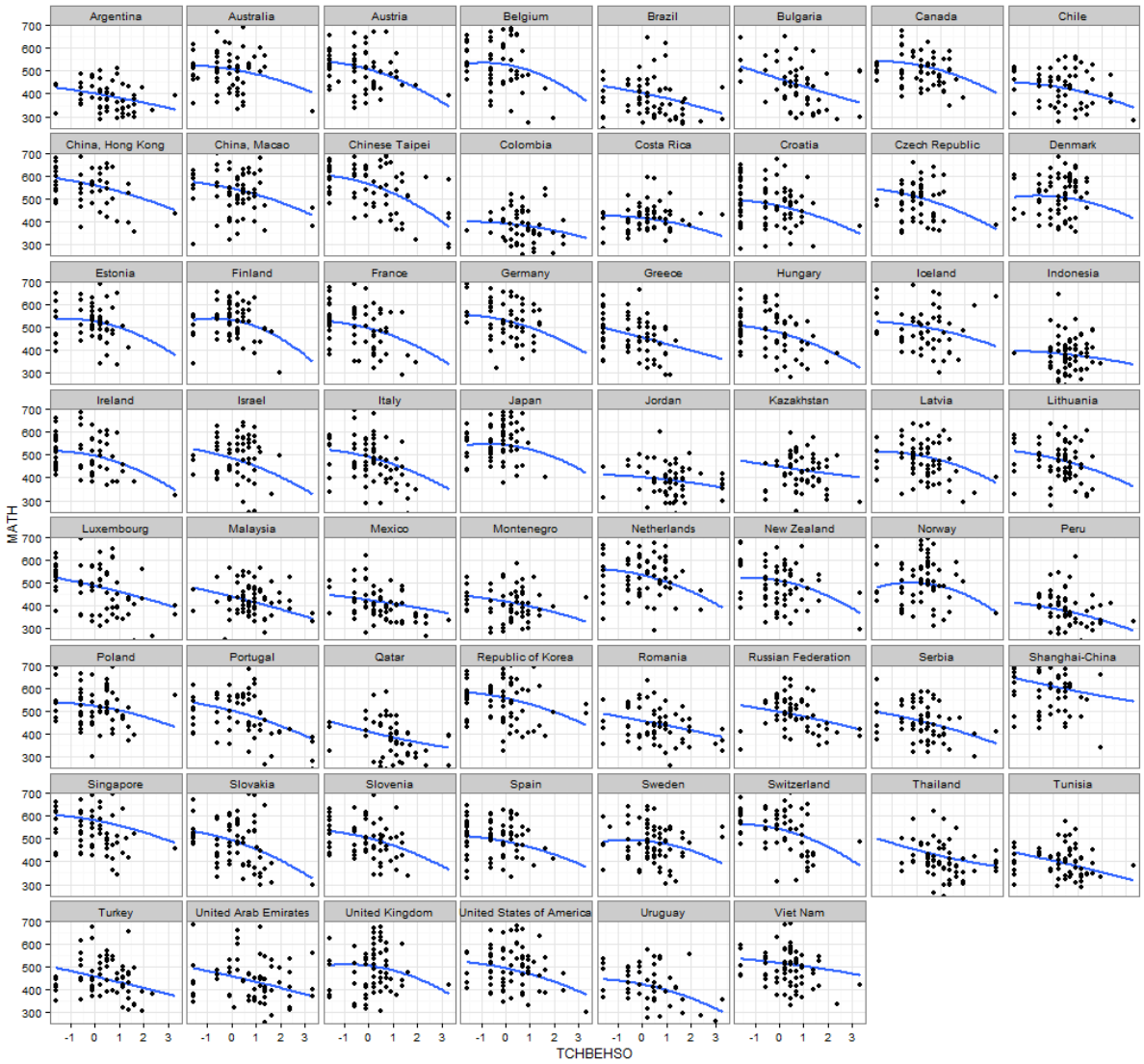


Figure D3. Regression of MATH on linear and quadratic term of STUDREL.M

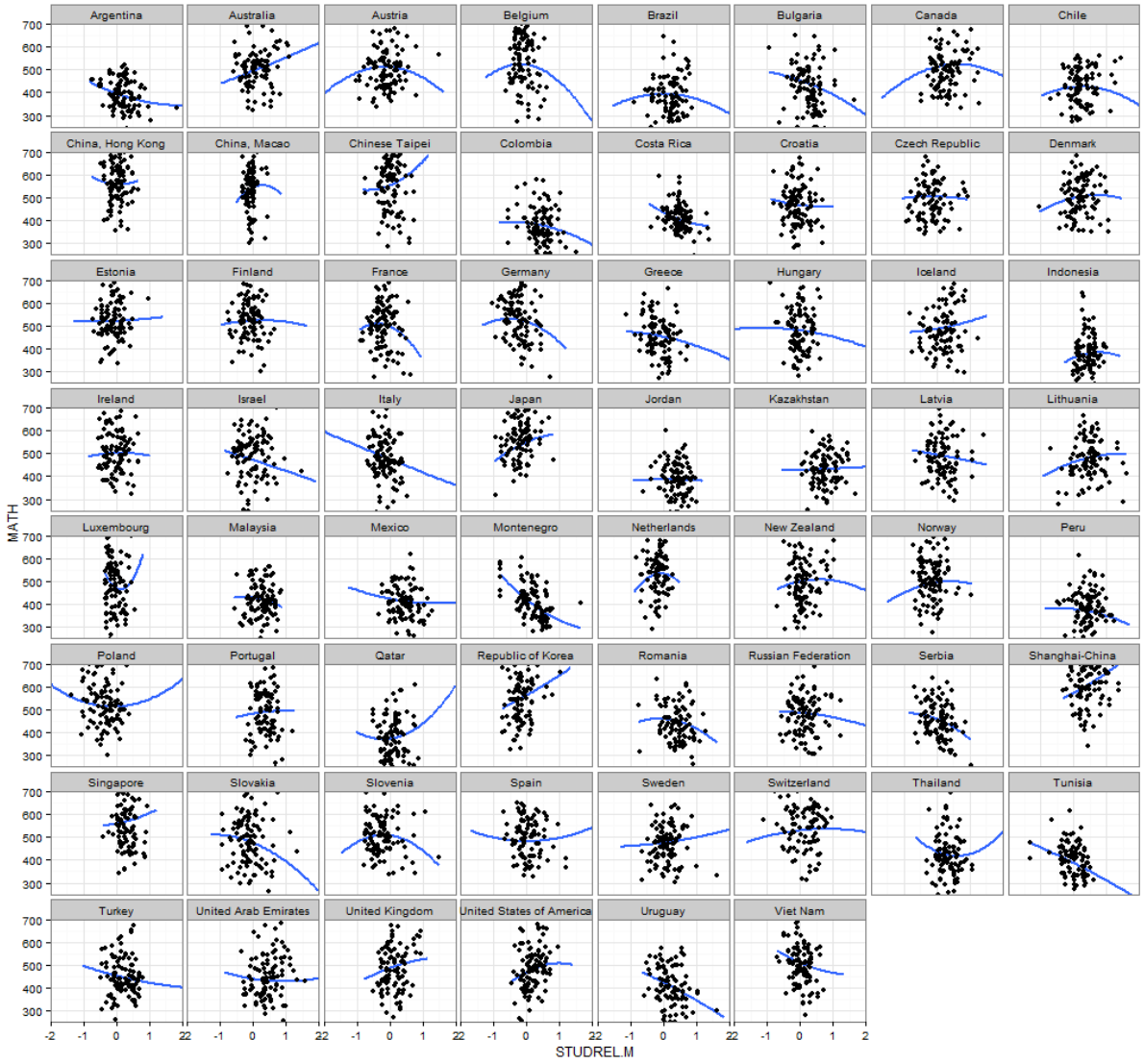


Figure D4. Regression of MATH on linear and quadratic term of DISCLIMA

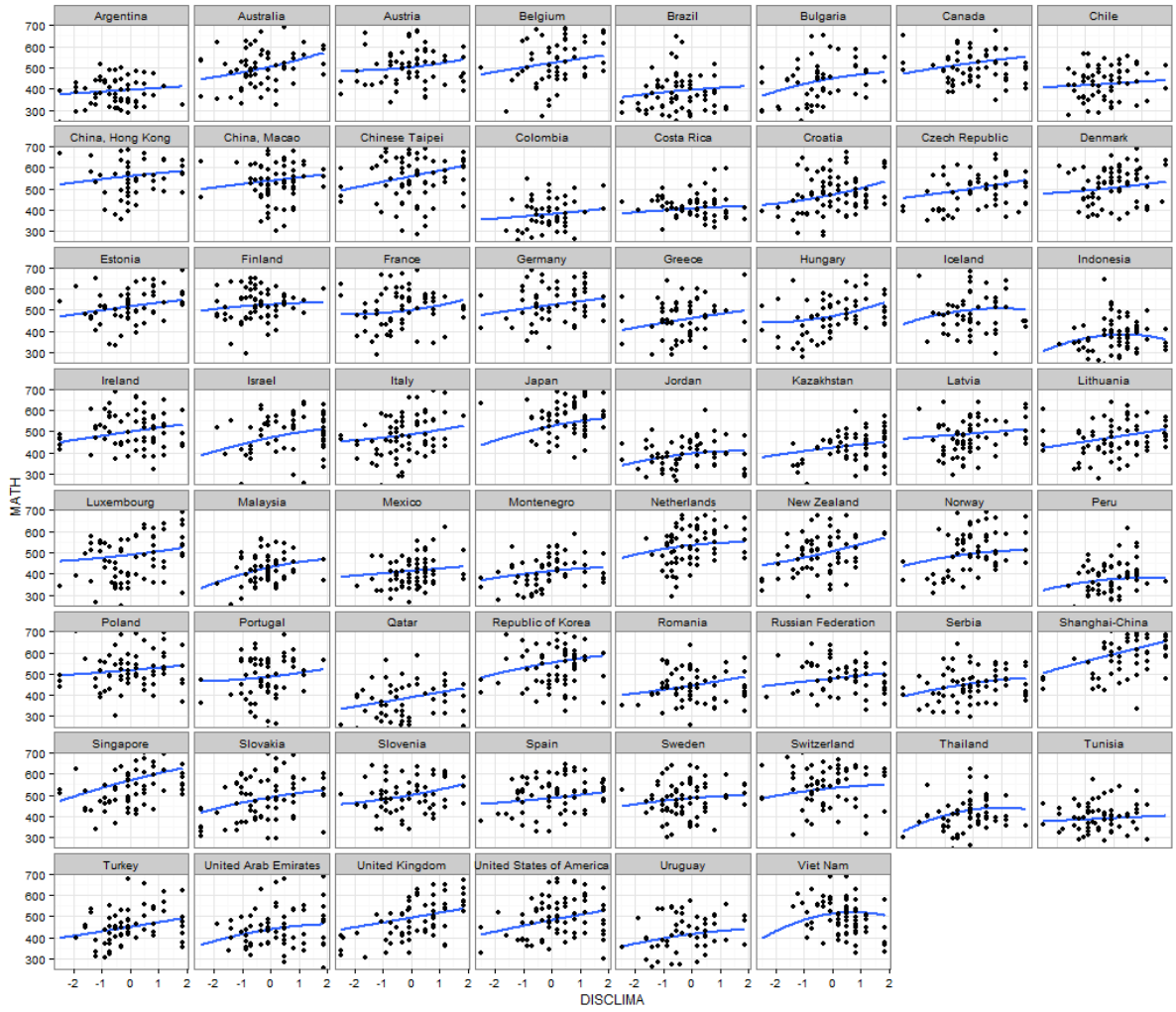


Figure D5. Regression of MATH on linear and quadratic term of CLSMAN