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The Measurement of Tracking, Vocational Orientation, and Standardization of Educational Systems: a Comparative Approach

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Abstract

Educational systems differ on at least three dimensions: the timing and form of tracking of students, the extent to which a system provides vocationally specific skills, and the extent to which an educational system is standardized nationwide. Existing conceptualizations of these three dimensions are rather fragmented, and in this article we develop new indicators for a large number of countries, based on various sources of data (OECD, UNESCO, TIMSS, PISA and Eurydice). With our new indicators we examine the relationship between the three dimensions of educational systems and four core functions of schooling: equality of opportunity, the optimization of students' skills, the allocation of students to the labor market, and the preparation for active participation in society at large.

JEL codes: I21; I25; I28

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1. Introduction and motivation

Comparative research on education has taken a tremendous development in the past decade. We have come to learn a lot about cross-national differences in the effect of education on labor market outcomes (Shavit & Müller 1998; Breen & Buchmann 2002; Müller & Gangl 2003; Bol and Van de Werfhorst 2013), in levels of student achievement (Hanushek & Wössmann 2005; Jenkins et al. 2008) and in effects of social origin on educational achievement (Brunello & Checchi 2007, Van de Werfhorst and Mijs 2010). In understanding this cross-national variation, researchers have proposed three different institutional characteristics that drive these outcomes: the placement of students in different educational tracks, the extent and the specificity of the vocational skills provided by a system, and the extent to which an educational system is standardized (Allmendinger 1989; Shavit & Müller 1998; Kerckhoff 2006).

We argue that there are two issues on which improvement can be made. First, the conceptualizations and operationalizations of (elements of) these three dimensions are fragmented. For each study new indicators are used, sometimes developed for the specific study, sometimes based on already existing indicators provided by statistical agencies. Often the used classifications of educational systems are poorly documented so that other researchers cannot replicate the findings or use the classifications of educational systems in other research. With the increased availability of institutional data of educational systems such as provided by the OECD, Eurydice, UNESCO, or other international organizations, it is now possible to rank countries on the three institutional dimensions based on available data, and make our classifications available to the field.

A second issue on which improvement can be made is the relationship between the three institutional characteristics and four central "functions" of education. Functions, in this understanding, should be seen as correlates of education on which basis one may judge the extent to which education is functional to the tasks that are set to them. Typically comparative research has examined educational inequality, skill optimization, and the allocation to the labor market as central functions of education. Given the aims of educational systems to improve equal opportunities, to optimize the attained skill level, and to provide skills relevant for work, these are three important correlates on which we should want to know the impact of institutions. In addition to these three functions that have been examined before, we study the

impact of educational institutions on a fourth central function of education: to socialize youngsters into society at large, by creating active citizens who actively participate in society.

In this paper we address both issues. First we give an overview of the three institutional characteristics of education that are relevant for cross national comparisons. In comparison to other data now used in the field our indicators are an improvement with respect to transparency of our sources and the number of countries for which the data is available. A total of 59, predominantly Western, countries have a score on one or more of the indicators. Secondly we describe the four central functions of education and formulate hypotheses on the relation between the institutional characteristics and these four functions. After this we will describe our data and method and discuss the results. In the final section we conclude.

1. Three institutional dimensions of educational systems

Comparative stratification research has proposed three dimensions on which educational systems can be classified cross-nationally: the level of tracking of students with different levels of scholastic ability, the extent to which systems provide vocationally specific skills, and the level of nation-wide standardization of regulations, funding, and examinations (Allmendinger 1989; Kerckhoff 1995; Shavit & Müller 1998; Horn 2009). We follow this literature and classify educational systems on these dimensions (albeit sometimes with two indicators for one dimension).

1.1. Level of tracking

Educational systems firstly differ to the extent to which students are placed in different educational tracks. Between these tracks it is clear which is the higher and which is the lower track (Allmendinger 1989). Tracking, in earlier research also defined as the level of stratification of an educational system (e.g. Shavit & Müller 1998), mainly takes place in secondary education, although there is tracking in post-secondary education as well (Shavit et al. 2007). It is important that our focus for this dimension is on tracking *between* educational programmes,[i] instead of the differentiation of students *within* different streams or tracks within the same educational programme. Arguably, systems that track between educational

programmes have more manifest forms of separating students on the basis of ability than internally differentiated systems, because such systems are characterized by separation for the full curriculum, often in separate school organizations, and for the duration of multiple years.

For example, Canada is a country where all students are in the same educational programme during the majority of their secondary education. Although in Canada education is organized on the provincial level, at almost all regions the tracking of students between programmes is relatively low. Students start in "Primary" or "Kindergarten" and end up in a "Secondary" or "Senior" programme. Other educational systems where there is a low level of tracking can be found in the Scandinavian countries (Denmark, Sweden, Finland, and especially Norway) and some of the Anglo-Saxon countries (United States, United Kingdom, and Australia).

A country where tracking forms an important part of the educational system is Germany. In Germany 10 year old students face three options after primary education: "Hauptschule" (lowest level), "Realschule" (intermediate level), and "Gymnasium" (highest level).[ii] Next to educational level these progammes differ in curricula and organization: the three options do not teach the same subjects and differ, for example, in length. It is however possible to start at "Hauptschule" and finally get an "Abitur" (the examination for the "Gymnasium"), but such transitions are relatively rare. Other countries that have a tracked educational system are the continental European countries (Netherlands, Belgium, Austria, and Luxembourg) as well as some Eastern European countries (Slovenia and Hungary) and Turkey.

1.2. Level of vocational orientation

A second dimension on which educational systems differ is the level of vocational orientation: the extent to which education provides students with vocational skills, and the specificity of these skills. Education can supply students with general and specific skills, and the balance between these two differs across educational systems. The specificity of skills in education is mainly associated with vocational programmes, where the emphasis lies on learning highly (work-)specific skills. While the prevalence of vocational education differs across educational systems, there is as much variation in the specificity of the skills that are taught in vocational educational programmes. Many educational systems provide vocational programmes in a few broad fields, while other educational systems provide students with job

specific skills by offering a dual system in which institutionalized education and working in firms are combined. Both are categorized as vocational education, but the skills that are provided in the dual system are more specific than those in broad vocational programmes. Because of this, the dual system is said to be particularly relevant to provide students with specific work-relevant skills (Breen 2005). Educational systems thus differ in the extent and the form of their vocational training programmes and whether they offer a dual system (Shavit & Müller 1998; Müller & Gangl 2003). Systems that are highly vocational provide (more) students with specific skills, while less vocational systems produce more generally skilled students.

While the United States and Canada are often mentioned as educational systems with little emphasis on vocational training, Brazil belongs to this group as well. Education takes place there in three main stages; fundamental, medium and higher education. There are some possibilities in higher education to get vocational schooling, but the majority of education is non-vocational (Gvirtz & Beech 2008).

The Czech Republic on the other hand, has an educational system where vocational education is well-developed. Besides a Gymnasium programme there are several vocational programmes that students can participate in (e.g. “Stredni Skola” or “Konzervator”). Vocational education here does not only take place at the secondary but also on the tertiary level. This means that a high percentage of students is enrolled in some kind of vocational education. Next to broad vocational programmes the educational system of Czech Republic has a strongly developed dual system as well. Here students are working and participating in education at the same time. Continental European countries (Netherlands, Belgium, Austria, and Switzerland) as well as some eastern European countries (Hungary, Slovakia, and Slovenia) have educational systems that offer vocational programmes as well. The countries where vocational education is less important are more geographically dispersed (e.g., Australia, Ireland, and Uruguay).

1.3. Level of standardization

All educational systems in all countries are to a certain degree standardized: "the degree to which the quality of education meets the same standards nationwide" (Allmendinger 1989, p. 233). Standardization is achieved by institutions like the use of central exams, uniform curricula, the same training for teachers, and standardized budgets. We distinguish between two forms of standardization: standardization of input and standardization of output (cf. Rowan 1990).

Standardization of input refers to the extent to which schools have limited control over the input in education. Examples of such standardization are restrictions for schools on what they teach and how they teach it. Some countries, for example Greece or Jordan, regulate the text books that are used for courses, whilst others give more autonomy to schools.

Standardization of output, secondly, describes the extent to which educational performance (the output) is tested against external standards. It tells us how much schools are held accountable for their performance (Horn 2009). This could for example be induced by a national inspectorate, or other regulatory institutes, but the most important institution concerns centralized exit examinations. Central examination leads to a standardization of the educational system as it obliges schools to learn their students what is examined in the central exams. Pioneering work on this topic has been done by Bishop (1997) and Wössmann (2000; 2005). Bishop argues that we must specifically look at curriculum-based external exit exams (CBEEEs) which guarantee a high level of standardization over the output of education.

Educational systems differ to a great extent on the dimension of standardization. A country where the educational system is not strongly standardized is Italy. Here the grading system and the commission that evaluate the exams are internally appointed by schools. This means that there is no external control on the quality of the exams. As an effect there are big disparities between regions; to obtain a degree in the Northern part of Italy probably more knowledge is expected than getting the same degree in the South. Since there is no nationwide external control educational degrees are hardly comparable.

In the Netherlands, on the other hand, the output of educational performance is highly standardized. There is a national commission who has the control over all the exams for secondary and vocational education. These standardized final exams, which are taken regardless of the school attended, make up for half of the final grade in the examinations, and

norms are set at the national level on the minimum grades in the centralized final exams. Even at primary schools a standardized test (the CITO-test) is used. In the Netherlands the input of education is less standardized as schools have the freedom to choose study material.[iii] Other standardized educational systems can be found in, for example, Iceland, New Zealand and South Africa whereas the educational systems in Switzerland, Belgium and Cyprus are characterized by lower levels of standardization.

2. Central functions of education

Education can be seen to have four central functions in contemporary societies (see also Fend 1974; Van de Werfhorst and Mijs 2010): allocating students to the labor market, optimize skills, promote equality of opportunity, and to socialize into society at large. An educational system that performs well on these aspects, is held to be a well-functioning educational system.

As a first domain, an educational system can be said to be well-functioning if graduates of different levels of education are well-prepared for the labor market. They have obtained relevant skills for working life, and employers are well-informed about those skills and are willing to reward these. This way, the labor market opportunities of school leavers are optimized, as well as the production of firms. A well-functioning educational system therefore adequately allocates students to the labor market.

The second function to which an educational system's performance can be assessed concerns the extent to which the system optimizes students' skills. Students differ with regard to their learning abilities, and education optimizes these abilities. An educational system can be seen as well-functioning if educational achievements of students are maximized, given a particular budget for education. The "total" production of knowledge and skills is then optimized.

The third function of education is that it can optimize equal opportunities to children of different social backgrounds. Educational systems can be seen as well-functioning if they minimize inequality of educational opportunity. This is not to say that educational systems would be able to fully eliminate educational inequalities, as inequalities partly result from family processes in which educational policy cannot interfere. Yet, if two educational systems differ in the extent to which they either enlarge or reduce inequalities, the system that reduces inequalities can be seen as, ceteris paribus, a better functioning system. Although this function

of education highlights equality of opportunity rather than equality of outcomes, studies have shown that both forms of equality are strongly linked (Duru-Bellat & Suchaut 2005).

The fourth function of educational institutions is to socialize the youth into society at large. By socialization, we refer to increasing the commitment to, and involvement with, the society of which youngsters will be part. Through schooling, students get informed about regional, national and supranational institutions (e.g. legal or political), obtain knowledge on current affairs, develop democratic attitudes, and improve their social skills. All these civic qualities will help them to be involved with societal issues at large, helping them to become active citizens. A well-functioning educational system not only optimizes these qualities, but also minimizes variations between students in them. A common view in political philosophy is that the only legitimate justice criterion in the relationship between the state and its citizens is equality (e.g. Verba et al. 1995; Miller 1999). An educational system that "socializes selectively," by increasing inequalities in civic and political engagement is thus harmful to democratic equality, and may hence be seen as malfunctioning.

Within a given educational institutional structure, some of these four functions may be more easily met than others. A system that focuses on skill optimization may, for example perform less well when it comes to equality of opportunity (Brunello & Checchi 2007). This implies that, in the design of educational institutions, governments have to face policy trade-offs when a particular institution serves one function but harms another (Van de Werfhorst and Mijs 2010). Another trade-off is that between labor market preparation and equality of opportunity (Bol and Van de Werfhorst 2013). It is well-known that a strong vocational educational sector helps youngsters in the transition process from the educational system to the workplace. For instance, youth unemployment is lower in countries with a strong dual system (Breen 2005). On the other hand, several studies showed that the specific skills acquired in a dual system are not always beneficial. During the life course specific skills turn out to be one of the reasons of long unemployment. Furthermore, people from a dual system are more often stuck in poorly-paid jobs (Korpi et al. 2003). Yet, there still is a significant social class effect on choice for vocational versus generic types of schooling. If people enrolled in vocational secondary have fewer opportunities to enroll in tertiary education, strongly vocationally oriented systems may enlarge social class differences in the attainment of a tertiary-level degree.

3. Combining educational institutions and central functions of schooling

In this paper we study the four correlates of education and their connection to the three educational institutional dimensions. In Table 1 we summarize the hypothesized relationships between educational institutions and four core functions of education.

[Table 1 about here]

The first function that we distinguished concerns the way that education allocates people to the labor market. As said above, more vocationally oriented educational systems provide students with specific skills which should make the education to work transition easier. We therefore hypothesize that the school-to-work transition happens smoother the more vocationally oriented a countries' educational system is. Usual indicators for how effective education allocates students in the labor market are the level youth unemployment (Breen 2005), and the length of the school-to-work transition (Wolbers 2003). We expect these effects for both the prevalence of vocational education (*hypothesis 1a*) and the vocational specificity (*hypothesis 1b*).

The second task is skill optimization, making sure that the attained skill level in a society is maximized given a particular budget for education. A simple measure of this goal is average academic achievement. Several studies showed that the level of standardization of output of an educational system enhances student performance (Bishop 1997; Horn 2009). A first rationale is that students are willing to work harder if they know that the degree they are working for has a higher value. This is believed to be the case in educational systems where the output is standardized by using, for example, exams (Spence 1975; Stiglitz 1975). A second reason is that because the government monitors the quality of education more in more standardized educational systems the performance increases. Earlier research found significant effects of the level of standardization of output on student performance (Bishop 1997; Fuchs & Wössmann 2007; Hanushek & Raymond 2004). We therefore expect that in educational systems in which output is standardized the average student performance is higher (*hypothesis 2a*). However, with regard to input, it has been argued that weak standardization leads to higher performance due to higher levels of competition between schools (Wössmann 2003). So *hypothesis 2b* reads that higher levels of standardization of input lead to lower average school performance.

The third function of education is to enhance equality of opportunity. Research showed that the effect of tracking on equality of opportunities is negative (Erikson & Jonsson 1996; Lucas 2001; Van de Werfhorst and Mijs 2010): the more tracked the educational system is, the lower the equality of educational opportunity. In systems where the choice of educational programme is made earlier, and has more severe consequences because of the rigid form of selection in separate school organizations for the duration of multiple years, it is likely that parents play a relatively large role in educational decision making. Given that the distribution of achievement is strongly related to school type, social origin is relatively important for one's place in the distribution of student performance in more strongly tracked educational systems (*hypothesis 3*).

Finally, a function of educational institutions is to socialize students into society, thereby promoting active citizenship. Thus far only limited evidence exists for the relation between this central function and the educational institutional structure . It is however plausible that tracking has a negative impact on commitment to active citizenship. It prohibits communication between groups that are strongly separated on the basis of social and ethnic background, and communication is central to the development of critical citizens. Hyland (2006) has, for example, argued that a more heterogeneous composition of school classes lead to more equality in democratic attitudes and values on political participation. Janmaat and Mons (2011) demonstrate that the variability in civic competences is larger in countries with a tracked educational system. It is likely that students in the academic programmes get trained in civic competences related to critical thinking, whereas students in the vocational programmes get little education with regard to skills that are relevant for political awareness, and knowledge on democratic institutions (Ten Dam & Volman 2003). Therefore, we expect that tracking leads to lower levels of active citizenship (*hypothesis 4*).

4. Measuring educational systems

A large share of this article is dedicated to the description of our measurements of the three dimensions of educational systems. While these dimensions are theoretically very relevant and often used in research, a clear overview of how they can be measured is missing in the literature. Most of the indicators we propose are derived from a principal factor analysis. This means that the score of each country on a certain dimension is based on its relative position relative to all the other countries that are in the sample. Eventually we create standardized

indicators on a maximum number of countries on which we were able to collect data. The score of a country on this standardized indicator is therefore fixed, and independent on whether a country is part of one particular empirical analysis or not. This is particularly helpful because it may help other researchers to use our scales independent of the countries they have in their dataset.

We decided to perform separate factor analyses for each dimension, as this allows us to increase the number of countries that have the available data for the specific dimension. All the specific references and sources of the data we use to create the indicators is summarized in appendix A.

4.1. Level of tracking

The level of tracking is constructed by performing a factor analysis on three country level variables that are good indicators for tracking. The first indicator that we use is the age of first selection. This indicator tells us when the actual tracking starts. It is the most important indicator of tracking and often used as the only indicator (see, e.g., Hanushek & Wössmann 2006). Data for this indicator is gathered by OECD (2005). The second indicator we use is the length of the tracked curriculum. This indicator expresses the tracked curriculum as a percentage of the total curriculum in secondary education. The length of the tracked curriculum is derived from Brunello and Checchi (2007) and tells us what share of educational programmes takes place in tracked form. The third and final indicator that is used to construct the index is the number of distinct school types that are available for 15-year old students. The logic behind this indicator is that tracking takes place, or at least starts, especially in secondary education and the number of different educational programmes that are available for someone of the age of 15 indicate tracking of an educational system best. It tells us something not on the time when tracking starts or what share of the educational system is differentiated, but on the extent to which this is the case. The data for this indicator was derived from the OECD (2005). Together these three variables give a comprehensive view on tracking and pay attention to all theoretical aspects of the dimension.

On these three indicators a principal factor analysis was performed, and all three indicators loaded on one factor. The eigenvalue of this factor was 1.76, giving enough statistical leverage to claim that all three variables indicate one latent concept. All factor loadings are

saved as regression coefficients., thereby giving all countries a relative score on the index of tracking, with a mean of zero and a standard deviation of one.

4.2. Level of vocational orientation

The level of vocational orientation is divided in two variables: the prevalence of vocational enrolment and the specificity of the vocational education. The reason why we chose this less parsimonious way of summarizing the vocational orientation of educational systems has to do with the specific role of specific skills that are taught in the dual system (especially on the allocation of students in the labor market) that is emphasized by several studies (e.g. Breen 2005).

The first indicator of vocational orientation is the prevalence of vocational enrolment. There is a high level of between country variance with respect to the percentage of students that are enrolled in any kind of vocational education (the specificity of this vocational education is addressed by the next measure). Our focus is on the amount of students that are enrolled in vocational programmes in upper secondary education, as vocational schooling mostly takes place in upper secondary education. On top of this, it is especially vocational education in upper secondary educational programmes that provide the final schooling before entering the labor market. To measure the prevalence of vocational education we use two indicators: vocational enrolment as a percentage of upper secondary education as measured by the OECD (2006) and by UNESCO.[iv] To reduce measurement error we use both indicators instead of just one and perform a principal factor analysis to create a new index of enrolment in vocational programmes. The eigenvalue of the one factor that stood out was 1.84, and the factor loadings are saved the factor as regression scores. The new index, vocational enrolment, has a mean of zero and a standard deviation of one.

While enrolment in vocational programmes reveals the prevalence of vocational education—which is indicative of the extent to which vocational education is institutionalized in a country—another element of vocational education examines more deeply how the vocational training system is set up. In particular, vocational education and training systems differ in the extent to which learning takes place in a dual (school-based and work-based) form. The existence of a dual system tells us a lot on the provision of specific vocational skills. In a dual system students learn and work at the same time, based on the idea that the

necessary skills for a job are best learned on the job. Instead of only focusing on learning in the context of a school, the context of the employer is at least as important. The strength of the dual system is measured by a single indicator; the percentage of students in upper secondary education that are in a dual system (OECD 2007).

4.3. Level of standardization

Following the theoretical section, we operationalize the level of standardization in two different variables: standardization of input and standardization of output. Standardization of input deals with the autonomy of schools and the extent to which they can decide by themselves how and what they teach. This is an important category for the level of standardization: the more schools are alike in terms of teaching methods and curriculum, the more standardized an educational system is. When schools cannot decide themselves how they organize their education, there will be higher similarities in students' knowledge in different schools. In the 2006 data of the Programme for International Student Assessment (PISA), school principals were surveyed on topics that concern the standardization of input.

We aggregated three questions to the country level (with the lowest score being the most autonomous and the highest score being the most standardized) and a principal factor analysis was performed on these variables. The variables measure the extent to which schools are autonomous in choosing textbooks, the course content, and the courses that are being offered.[v] These variables give an accurate view on how much a school is standardized with respect to input. All variables range from zero (low level of standardization of input) to one (high level of standardization of input), which resembles the percentage of principals in a country who answered positive or negative to the questions. On these four variables a principal component factor analysis was performed and one factor stood out (eigenvalue=2.14), interpreted by us as the level of standardization of input. The index has mean of zero and a standard deviation of one.

The second index of standardization is standardization of output. The indicator that is most important for this kind of standardization is the existence of centralized exit exams. In educational systems with nationally regulated exit exams the quality of the skills obtained in education are standardized. Although a national educational board, a national curriculum or national education inspectorate are other potentially relevant indicators, the existence of

central examinations have the most direct bearing on the accountability of schools and thus the standardization of their output. In countries with a national curriculum, it remains unclear if the students are on the same level after attaining the same education. In the measurement of central examinations we follow the five criteria proposed by Bishop (1997, p. 260). Firstly exams should have real consequences and not only be symbolic. Secondly degrees issued after exams are tested against an external standard. Thirdly, the central examinations are organized by discipline. Fourthly, it is not only a pass and fail exam, but there is also some differentiation in the possible outcome. Finally it concerns secondary school students and covers almost the complete secondary student population. All these criteria ensure that it is standardization of output that is imposed by central exams.

Standardization of output is a dummy variable: when there are central exams in secondary education a country scores a one. Two sources of data were used in determining the existence of central exams. The first source for information was the section on examinations, qualifications and titles in the European Glossary on Education (Eurydice 2004). The second source utilizes earlier research on this topic by Wössmann (2005) and Wössmann et al. (2009, p. 123). Their data is based on accounts of national experts and is not completely a dichotomous variable. Following Wössmann et al. (2009, p. 123), in four countries (United States, Germany, Canada and Australia) the percentage of regions where central examination exists is used.

[Table 2 about here]

Summary

In Table 2 all five indicators are shown for as many countries as we could find data for. All sources and raw indicators are tabled in Appendix A. To summarize this paragraph on the description of the data we will discuss the correlations between the five indicators.

[Table 3 about here]

Table 3 shows that tracking has a sizeable correlation with both indicators of vocational orientation: 0.48 and 0.40 for vocational prevalence and vocational specificity, respectively.

This indicates that tracked educational systems are often also those systems that offer (more) vocational education. The most likely explanation for this high correlation is that in comprehensive systems with only one track (for example the United States), this one track will offer general instead of vocational education. When there is a high level of tracking, it is likely that at least one of the tracks will have a vocational nature or takes place in the form of a dual system. We can see this even better in Figure 1, where we plotted all countries on their levels of tracking, vocational prevalence, and vocational specificity.

[Figure 1 about here]

Although most countries follow the general pattern where high levels of tracking and vocational orientation are combined, there are educational systems, in particular in Scandinavian countries, England and Australia, that have a relatively high score on the vocational orientation index but not on the tracking index. These systems are characterized by non-differentiated schooling until around the age of 16, after which vocational programmes are offered that are quite sizable in terms of student numbers. In Denmark the vocational specificity comes also in the form of a sizeable dual system.

Figure 1 also shows the scatter plot of both indicators of the dimension of vocational orientation; the prevalence of vocational enrolment and the vocational specificity. As expected we find a positive correlation between the two variables (0.54, see Table 2). The correlation is however far from perfect, indicating that the distinction between vocational prevalence and specificity is not only theoretically but also empirically relevant. While in some countries (for example Slovenia) a large amount of students is enrolled in vocational education, the skills that they obtain are not highly specific. In other countries, for example Estonia or Hungary, the total percentage of students enrolled in vocational education is not extremely high; however, most of them are enrolled in a dual system.

The final dimension is standardization and consists of two indicators: the standardization of input and the standardization of output (central examinations). The correlations between the standardization of input and all other indicators are relatively small: 0.21 with tracking, -0.14 with vocational prevalence, and -0.11 with vocational specificity, and 0.01 with standardization of output. One reason for the positive correlation between tracking and standardization of input is that creating a homogenous curriculum is easier when students with different ability levels are clustered in different tracks. It is difficult to standardize textbooks,

for example, when students of different ability levels are in the same track, whilst this is not the case in tracked systems.

The negative correlations of standardization of input with both indicators of vocational orientation could point to the fact that vocational programs are less suited for standardization. In vocational programs often job-specific skills are gained, which makes it hard to test these nationwide, or standardize the input of these vocational skills. This is also confirmed by the negative correlation between standardization of output (central exams) and vocational specificity (-0.29), which again shows that educational systems that offer vocationally specific skills less often implement central exit exams. Finally, the correlation table shows that there is no correlation between the standardization of input and the standardization of output. This demonstrates that the distinction between standardization of output and input is a relevant one; and that both are not related; at least not on the country level.

5. Data and methods

In the previous paragraph we presented the three dimensions of educational systems, the five variables that we created for these dimensions, and the ways in which these are related. Now we turn to the question to what extent these indicators are related to central functions of education: allocating students to the labor market, sort efficiently to maximize learning, to offer equal opportunities, and to socialize youngsters into society at large by stimulating active citizenship.

To study this we perform OLS regressions and use the indicators we established for the three different dimensions as independent variables. It is important to note that our analyses are carried out using country-level information only, and therefore are not suited to base strong individual level claims on. However, the analyses are mainly aimed to test the validity of our indicators, and only to provide a broad picture of the relationship between the institutional variables and central outcomes of education systems.

To measure the allocation function of education we use two variables (cf. Bol and Van de Werfhorst 2013). First, we focus on the level of youth unemployment as a ratio of adult unemployment. The youth unemployment ratio is derived from the UNESCO online database and is based on data from the year 2002. The second variable we use is the average duration of the school-to-work transition, as measured by the OECD in the Employment Outlook of 2008 (OECD 2008b, p. 72). When educational systems function well according to labor

market allocation, this should be displayed by low youth unemployment and short duration spells between leaving school and entering the labor market.

Skill optimization, the second function of education, is measured by using the average score on a cognitive test. We use a country aggregate of data from the PISA 2009 study, a large country comparative performance survey. Here we use the aggregate country score on the PISA 2009 mathematics test. The results we present later are highly similar to results using the score on the PISA 2009 science or reading test as dependent variable.

The third function of education, relating to equality of opportunities, is measured with data from PISA 2009 as well. On the basis of that survey we calculated the effect of social origin on performance. The used indicator takes the difference between the average performance on the mathematics test of children who grew up in a high social class environment (top decile) and the average performance on the mathematics test of children who grew up in a low social class environment (bottom decile). A larger score on this indicator means a larger class-based gap in the score on the mathematics test (cf. Bol and Van de Werfhorst 2013).

The final function of education, relating to preparing youth for active civic engagement, is measured by the level of participation in voluntary organizations other than a religious, sports, leisure, political organization or a trade union. We use the data of the International Social Survey Programme (ISSP) of 2004, where a special section was dedicated to citizenship. We aggregated individual scores of the dummy variable (participation = 1) to the country level.

All results are controlled for the percentage of GDP per capita that is spent on each student in secondary education (World Bank Data[vi]) to make sure that we are not measuring an effect of resources instead. The results for the two dependent variables that are associated with labor market allocation (youth unemployment ratio and length of school-to-work transition) are also controlled for the strictness of employment protection, since this is well-known to affect the transition from school to work (e.g., Nickell 1997). In appendix B the dependent variables, control variables, and their sources, can be found.

6. Results

In this section we discuss the regression results where the dimensions of educational systems are the independent variables and the four central functions of education constitute the dependent variables. The labor market allocation function of education, assessed by the youth to adult unemployment rate and the length of the school-to-work transition, is related to the educational institutional variables in Table 4.

[Table 4 about here]

In the Model 1 of Table 4 we see that four indicators are significantly related to the youth/adult unemployment ratio. Tracking and vocational specificity decrease the extent to which youth is unemployed, whereas the standardization of input and vocational prevalence are positively related to youth unemployment. When we control our findings for government spending on education and the strictness of employment protection two results remain. First, we find that in countries where the educational system provides students with highly job-specific skills in the form of a dual system there are relatively less unemployed youngsters. Second, and more surprisingly, we find a negative effect of the vocational prevalence. Thus, only the dual system, not just any form of vocational education, enhances the integration of youngsters into employment (see also Breen 2005; Bol and Van de Werfhorst 2013). Net of vocational specificity, the vocational prevalence even has a negative effect. The results shown in Model 2 confirm hypothesis 1b, while with this dependent variable we do not find evidence for hypothesis 1a.

In Model 3 and 4 the results of the regression with average length of school-to-work transition as dependent variable is shown. Both indicators of vocational orientation have a negative effect on the average time it takes to find a job, only the vocational prevalence, however, has a significant effect. When an educational system is more vocationally oriented the time it takes to find a job is lower, but this effect is particularly driven by the prevalence of vocational education instead of the specificity of the skills that are taught. When more students are enrolled in programs where they acquire job specific skills, the amount of years it takes before students enter their first job is lower. By using this dependent variable we only confirm hypothesis 1b, and find no evidence to substantiate hypothesis 1a.

The second function of education is to optimize students' skills, in order to enhance later productivity. There are several ideas on how educational systems influence the performance of students. The most important characteristic of educational systems that is argued to affect student performance is standardization. Table 5 shows the outcomes of the regression analysis.

[Table 5 about here]

With respect to standardization, we only find significant effects of standardization of input. When schools are more standardized, the average performance is lower (Model 5). This is in line with our hypothesis 2b, where we argue that a high level of standardization of input decreases room for competition between schools. Our results confirm the findings by Wössmann (2003), although in Model 6 the effects disappear. The effect of central exams, the standardization of output, is positive in both models, but does not reach statistical significance. Contrary to earlier findings we do not find support for hypothesis 2a, which assumed a positive effect of standardization of output on average performance. There could be different reasons why we do not fully confirm the results of earlier results with our data, for example that the average score is equal across countries while the variation is much higher. This is something that has yet to be researched.

The third function of education is to promote the equality of opportunity between social classes. In Model 7 and 8 the regression results of educational dimensions on the difference between PISA mathematics performances of higher and lower class children are shown. The results clearly show that tracking increases the inequality of opportunity. The difference in performance between students from a higher social class and students from a lower social class increases as educational systems get more tracked. When students are separated in more different tracks at a younger age, social background determines to a larger extent in which track you will end up. Our hypothesis 3 is hereby confirmed: more tracking leads to a stronger influence of socioeconomic class on science test scores.

The final function of education is to prepare students for active civic engagement. We hypothesized that especially tracked educational systems may be harmful to this function, as they increase the separation of students on the basis of social background. The results, using participation in voluntary associations as dependent variable, are shown in Model 9 and 10. As expected we find a negative effect of tracking on the average participation in voluntary associations. The more tracked an educational system is, the less likely people are to be

"active" citizens. For all other education variables no effects where found, and we therefore accept our hypothesis 4. How an educational system is organized seems related to the socialization function of education.

Conclusion

For this paper we set two goals: (1) conceptualize the different dimensions of an educational system and (2) see how these dimensions are related to four central functions of education. We argued that there are three dimensions that one can distinguish in educational systems: the extent to which they are tracked, the vocational orientation and the level of standardization. These three dimensions turned out to be distinguishable with different sources of macro-data which led to five institutional variables that are useable in future research. The five variables are created for a large number of countries.

We also showed that dimensions of educational systems are related to four central functions of education. Not all functions are performed equally well by each educational system. This for example means that school leavers in educational systems with a strong vocational orientation on average will be allocated to the labor market sooner, and that in more tracked educational systems the educational opportunities of lower class children are lower. We furthermore found a negative effect of the standardization of input on the performance of students. More autonomous schools seem to enhance the performance of students. Our final results showed that the level of tracking within an educational system influences the civic behavior of citizens: in countries with a differentiated educational system the participation in voluntary associations is lower than in countries were educational programmes are not stratified.

These results should, however, be interpreted with caution: no micro level mechanisms were empirically tested and the country level regression results cannot provide evidence for such mechanisms. The results of this study do however show that several dimensions of educational systems are highly important for highly different functions of education. It is therefore as important to measure educational systems correctly and with more universal and replicable measures. Only then the studies of the importance of educational systems on differing outcomes can be compared.

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Tables

Table 1. Summary of Hypothesized Relationships between Educational Institutions and Four Central Functions of Education.*

		Labor market allocation	Skill optimization	Equality of opportunity	Socialization
Tracking				Hypothesis 3:—	Hypothesis 4: —
Vocational orientation	Vocational enrolment	Hypothesis 1a: +			
	Vocational specificity	Hypothesis 1b: +			
Standardization	Standardization of input		Hypothesis 2b:—		
	Standardization of output		Hypothesis 2a: +		

Table 2. Indicators of educational systems.

	Tracking	Vocational prevalence	Vocational specificity	Standardization of input	Standardization of output
Argentina				-.902	
Australia	-1.078	.967		-1.175	.81
Austria	1.751	1.701	32.7	-.095	0
Belgium	1.041	.945	3.3	.033	0
Brazil			0	-.894	
Bulgaria	-.075	.623		1.182	1
Canada	-1.315	-1.723	0	.905	.51
Chile	.233	-.164	0	-.077	
Colombia				-.916	1
Croatia				1.691	
Cyprus		-1.23			0
Czech Republic	1.671	1.744	35.5	-.595	0
Denmark	-.93	.455	47.7	-.298	1
Estonia		-.441	30.9	-.647	1
Finland	-.93	.737	10.5	-.614	1
France	-.477	.393	11.3	-.008	1
Germany	1.789	.887	45	.018	.44
Greece	-.477	-.306	5.1	2.067	0
Hong Kong	-.204			-.976	1
Hungary	1.297	-.7	13.2	-.092	1
Iceland	-.875	-.142	16.4	.138	1
Indonesia		-.268		-.391	1
Iran					1
Ireland	-.128	-.354	3.8	-.236	1
Israel	-.127	-.269	4.1	.194	1
Italy	.184	.948	0	-.34	1
Japan	-.477	-.729	0	-1.243	1
Jordan		-1.004		1.612	
Korea (Rep.)	.104	-.55	0	-1.151	1
Latvia	-.477	-.184		.831	1
Liechtenstein	.552			.004	1
Lithuania				-.124	1
Luxembourg	.755	.992	13.6	2.079	1
Macedonia					

Malaysia					
Malta		-1.186			1
Mexico	.745			.298	
Moldova		-1.385	0		
Morocco					

Table 2, continued.

Netherlands	.971	1.26	20	−.701	1
New Zealand	−.546		0	−.762	1
Norway	−1.078	.885	13.3	.459	1
Philippines		−1.844			0
Poland	−.043	.296	6.5	−.498	1
Portugal	−.043	−.442		−.041	1
Romania				.215	1
Russian Fed.	−.25	.102		.157	1
Singapore					1
Slovakia	1.059	1.492	31.7	.817	0
Slovenia	.764	1.056	3.7	1.293	1
South Africa					
Spain	−.803	−.001	2.8	−.841	0
Sweden	−1.058	.686	0	−.127	0
Switzerland	−.024	1.078	58.3	−1.114	0
Taiwan	−.215			−.869	
Thailand		−.27	0	−1.103	1
Tunisia		−1.593	0	2.077	1
Turkey	1.11	−.139	7.4	1.154	1
United Kingdom	−1.078	.467	0	−.592	1
United States	−1.315	−1.844	0	−1.089	.09
Uruguay		−.943	0	1.287	

NOTE. – All sources of the indicators can be found in Appendix A. Empty cells indicate missing values on that indicator.

Table 3. Pairwise correlations between all indicators

	Variable	1	2	3	4	5
1	Tracking	1.00				
2	Vocational enrolment	0.48	1.00			
3	Vocational specificity	0.40	0.54	1.00		
4	Standardization of input	0.21	−0.14	−0.11	1.00	
5	Standardization of output	−0.17	−0.08	−0.29	0.01	1.00

NOTE. – Based on calculations with data from Table 2 and Appendix B. Correlations are calculated for all countries that have a score on the two variables. The sample between the correlation is therefore different.

Table 4. Effects of educational system on four central functions of education (1).

	Youth unemployment ratio		School-to-work transition (years)	
	(1)	(2)	(3)	(4)
Tracking	-0.28**	-0.17	0.14	0.07
	(0.11)	(0.14)	(0.18)	(0.24)
Vocational prevalence	0.40***	0.33**	-1.00***	-0.99**
	(0.12)	(0.15)	(0.28)	(0.31)
Vocational specificity	-0.02***	-0.02***	-0.02	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Standardization of input	0.07	0.03	-0.45	-0.45
	(0.20)	(0.21)	(0.32)	(0.35)
Standardization of output	0.22**	0.19	-0.00	-0.07
	(0.11)	(0.12)	(0.18)	(0.24)
Government spending on education		0.07		-0.06
		(0.05)		(0.15)

Employment protection legislation		0.17		0.08
		(0.20)		(0.38)
Constant	2.66***	1.50*	4.15***	4.59*
	(0.19)	(0.84)	(0.33)	(2.12)
R2	0.55	0.59	0.69	0.70
Observations	27	26	17	17

NOTE. – Based on calculations with data from Table 2 and Appendix B. The results in the models without controls remain the same with a constant sample (equal sample to the models with control variable).

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

Table 5. Effects of educational system on four central functions of education (2).

	Average score on math test		Class-based difference on math test		Civic participation	
	(5)	(6)	(7)	(8)	(9)	(10)
Tracking	-3.24	1.53	15.01**	13.03*	-0.08***	-0.05**
	(5.45)	(6.26)	(5.70)	(6.91)	(0.02)	(0.02)
Vocational prevalence	2.16	0.04	-2.88	-1.29	0.01	0.02
	(6.27)	(6.23)	(6.56)	(6.89)	(0.03)	(0.02)
Vocational specifity	0.30	0.21	-0.03	-0.02	0.00	0.00
	(0.34)	(0.36)	(0.35)	(0.39)	(0.00)	(0.00)
Standardization of input	-11.33**	-8.68	0.65	-0.73	0.04	0.04
	(5.19)	(5.22)	(5.42)	(5.77)	(0.03)	(0.03)
Standardization of output	4.23	5.64	-11.53	-13.20	0.04	0.03
	(10.01)	(9.97)	(10.46)	(11.02)	(0.04)	(0.04)
Government spending on education		1.50		-0.08		0.02*
		(2.34)		(2.59)		(0.01)

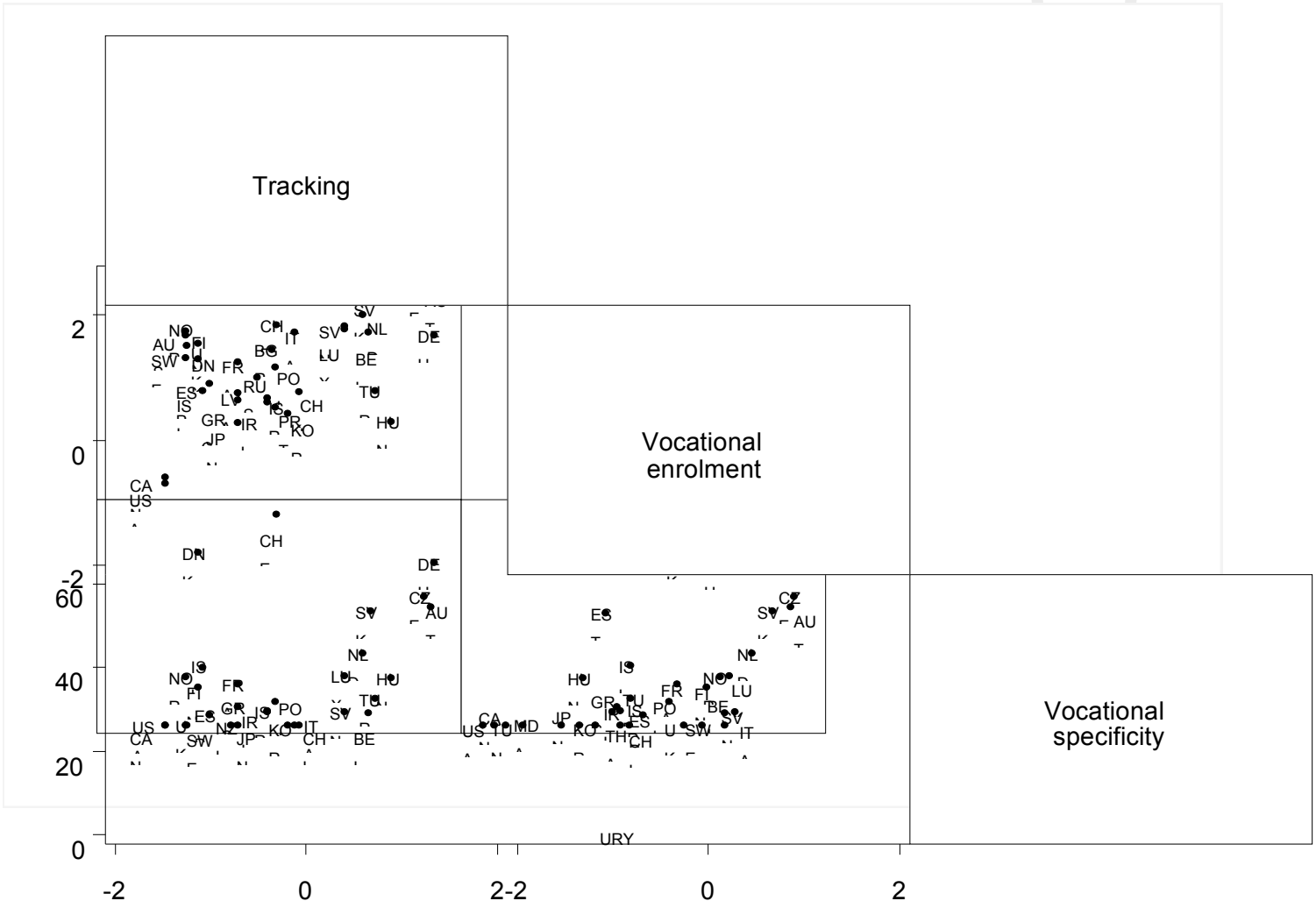
Constant	491.68***	475.78***	109.08***	109.55***	0.17***	-0.08
	(9.55)	(27.44)	(9.99)	(30.32)	(0.04)	(0.13)
R2	0.25	0.22	0.33	0.31	0.47	0.58
Observations	28	27	28	27	23	23

NOTE. – Based on calculations with data from Appendix B. The results in the models without controls remain the same with a constant sample (equal sample to the models with control variable).

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

Figures

Figure 1. Scatter plot of tracking, vocational enrolment, and vocational specificity.


Tracking
Vocational enrolment
Vocational specificity
URY
2
0
-2
60
40
20
0
-2
0
2
-2
0
2

Appendices

Appendix A1. Raw data of the tracking index.

Country	Length of tracked curriculum (2002)	Age of first selection (2003)	Number of tracks at 15 years old (2003)	**Index of tracking**
Australia	0.15	16	1	**-1.08**
Austria	0.67	10	4	**1.75**
Belgium	0.50	12	4	**1.04**
Bulgaria	0.36	14	2	**-0.08**
Canada	0.00	16	1	**-1.31**
Chile	0.42	13	2	**0.23**
Czech Republic	0.62	11	5	**1.67**
Denmark	0.25	16	1	**-0.93**
Finland	0.25	16	1	**-0.93**
France	0.25	15	2	**-0.48**
Germany	0.69	10	4	**1.79**
Greece	0.25	15	2	**-0.48**
Hong Kong (China)	0.28	15	3	**-0.20**
Hungary	0.67	11	3	**1.30**
Iceland	0.29	16	1	**-0.88**
Ireland	0.18	15	4	**-0.13**
Israel	0.48	15	2	**-0.13**
Italy	0.38	14	3	**0.18**
Japan	0.25	15	2	**-0.48**
Korea	0.33	14	3	**0.10**
Latvia	0.25	16	3	**-0.48**
Liechtenstein	0.18	11	3	**0.55**
Luxembourg	0.46	13	4	**0.76**
Mexico	0.45	12	3	**0.74**
Netherlands	0.45	12	4	**0.97**
New Zealand	0.50	16	1	**-0.55**
Norway	0.15	16	1	**-1.08**
Poland	0.38	15	3	**-0.04**
Portugal	0.38	15	3	**-0.04**
Russia	0.25	15	3	**-0.25**
Slovakia	0.22	11	5	**1.06**
Slovenia	0.62	15	5	**0.76**
Spain	0.33	16	1	**-0.80**
Sweden	0.17	16	1	**-1.06**
Switzerland	0.25	15	4	**-0.02**
Taiwan	0.27	15	3	**-0.22**
Turkey	0.55	11	3	**1.11**
United Kingdom	0.15	16	1	**-1.08**
United States	0.00	16	1	**-1.31**
Source	Brunello and Checchi 2007, p. 799	OECD 2005, p. 400; OECD 2006, p. 162	OECD 2005, p. 400; OECD 2006, p. 162	Factor analysis of column 2,3, and 4

Appendix A2. Raw data of vocational orientation

Country	Vocational enrollment in upper secondary education (2004)[a]	Vocational enrollment in upper secondary education (2006)[b]	**Index of vocational enrollment**	**Vocational specificity (2005)[c]**
Australia	62.48	61.63	**0.97**	
Austria	78.59	77.93	**1.70**	**32.70**
Belgium	68.21	55.33	**0.95**	**3.30**
Brazil	4.70			**0.00**
Bulgaria	55.50	53.48	**0.62**	
Canada	5.50	0.00	**-1.72**	**0.00**
Chile	36.14	37.94	**-0.16**	**0.00**
Cyprus	13.80	13.29	**-1.23**	
Czech Republic	79.45	78.96	**1.74**	**35.50**
Denmark	46.79	54.44	**0.45**	**47.70**
Estonia	31.00	30.94	**-0.44**	**30.90**
Finland	60.09	54.02	**0.74**	**10.50**
France	56.46	42.71	**0.39**	**11.30**
Germany	61.22	59.38	**0.89**	**45.00**
Greece	33.95	33.94	**-0.31**	**5.10**
Hungary	23.74	26.68	**-0.70**	**13.20**
Iceland	38.46	36.73	**-0.14**	**16.40**
Indonesia	35.30	34.28	**-0.27**	
Ireland	33.48	32.33	**-0.35**	**3.80**
Israel	35.18	34.38	**-0.27**	**4.10**
Italy	62.79	60.55	**0.95**	**0.00**
Japan	24.63	24.58	**-0.73**	**0.00**
Jordan	19.60	17.54	**-1.00**	
Korea	29.46	27.73	**-0.55**	**0.00**
Latvia	39.10	34.31	**-0.18**	
Luxembourg	63.93	61.34	**0.99**	**13.60**
Malta	14.90	14.14	**-1.19**	
Moldova	10.50	9.76	**-1.39**	**0.00**
Netherlands	69.06	67.98	**1.26**	**20.00**
New Zealand				**0.00**
Norway	60.53	59.96	**0.89**	**13.30**
Philippines	0.00	0.00	**-1.84**	
Poland	49.45	45.14	**0.30**	**6.50**
Portugal	28.46	33.29	**-0.44**	
Russia	41.48	44.32	**0.10**	
Slovakia	74.07	73.21	**1.49**	**31.70**
Slovenia	67.40	60.81	**1.06**	**3.70**
Spain	38.70	42.54	**0.00**	**2.80**
Sweden	53.41	58.12	**0.69**	**0.00**
Switzerland	64.85	64.15	**1.08**	**58.30**
Thailand	29.40	39.77	**-0.27**	**0.00**
Tunisia	3.00	7.93	**-1.59**	**0.00**
Turkey	37.25	37.97	**-0.14**	**7.40**
United Kingdom	71.48	31.77	**0.47**	**0.00**

United States	0.00	0.00	**-1.84**	**0.00**
Uruguay	18.70	20.98	**-0.94**	**0.00**
Source	OECD 2006a, p. 281	UNESCO Online database.	Factor analysis of column 2 and 3	OECD 2007, p. 277

Appendix A3. Raw data for standardization.

	Determine textbooks	Determine course content	Determine course offerings	**Standardization of input**	**Standardization of output**
Argentina	0.074	0.159	0.085	**-0.902**	
Australia	0.008	0.053	0.025	**-1.175**	**0.81**
Austria	0.045	0.457	0.442	**-0.095**	**0**
Belgium	0.023	0.555	0.457	**0.033**	**0**
Brazil	0.080	0.138	0.110	**-0.894**	
Bulgaria	0.218	0.911	0.866	**1.182**	**1**
Canada	0.547	0.838	0.476	**0.905**	**0.51**
Chile	0.213	0.609	0.166	**-0.077**	
Colombia	0.006	0.238	0.037	**-0.916**	**1**
Croatia	0.615	0.932	0.969	**1.691**	
Cyprus					**0**
Czech Republic	0.342	0.239	0.051	**-0.595**	**0**
Denmark	0.000	0.378	0.395	**-0.298**	**1**
Estonia	0.272	0.219	0.083	**-0.647**	**1**
Finland	0.006	0.368	0.142	**-0.614**	**1**
France	0.000	0.392	0.618	**-0.008**	**1**
Germany	0.181	0.721	0.144	**0.018**	**0.44**
Greece	0.984	1.000	0.931	**2.067**	**0**
Hong Kong	0.027	0.144	0.075	**-0.976**	**1**
Hungary	0.027	0.468	0.446	**-0.092**	**1**
Iceland	0.102	0.472	0.575	**0.138**	**1**
Indonesia	0.125	0.293	0.321	**-0.391**	**1**
Iran					**1**
Ireland	0.000	0.644	0.153	**-0.236**	**1**
Israel	0.428	0.593	0.248	**0.194**	**1**
Italy	0.003	0.428	0.304	**-0.340**	**1**

Japan	0.022	0.016	0.000	**-1.243**	**1**
Jordan	0.871	0.871	0.781	**1.612**	
Korea(rep)	0.026	0.058	0.026	**-1.151**	**1**
Latvia	0.392	0.875	0.489	**0.831**	**1**
Liechtenstein	0.250	0.417	0.417	**0.004**	**1**
Lithuania	0.183	0.533	0.234	**-0.124**	**1**
Luxembourg	0.903	1.000	1.000	**2.079**	**1**
Malta					**1**
Mexico	0.200	0.525	0.576	**0.298**	
Netherlands	0.005	0.224	0.230	**-0.701**	**1**
New Zealand	0.000	0.300	0.100	**-0.762**	**1**
Norway	0.010	0.677	0.682	**0.459**	**1**
Philippines					**0**
Poland	0.068	0.086	0.502	**-0.498**	**1**
Portugal	0.006	0.705	0.243	**-0.041**	**1**
Romenia	0.149	0.770	0.276	**0.215**	**1**
Russian	0.325	0.651	0.230	**0.157**	**1**
Singapore					**1**
Slovakia	0.423	0.725	0.619	**0.817**	**0**
Slovenia	0.538	0.843	0.796	**1.293**	**1**
Spain	0.006	0.266	0.067	**-0.841**	**0**
Sweden	0.000	0.437	0.472	**-0.127**	**0**
Switzerland	0.022	0.055	0.063	**-1.114**	**0**
Taiwan	0.043	0.185	0.107	**-0.869**	
Thailand	0.061	0.052	0.047	**-1.103**	**1**
Tunisia	0.987	0.961	0.980	**2.077**	**1**
Turkey	0.419	0.906	0.700	**1.154**	**1**
United Kingdom	0.017	0.365	0.156	**-0.592**	**1**
United States	0.012	0.104	0.037	**-1.089**	**0.09**
Uruguay	0.601	0.808	0.783	**1.287**	
Source	Aggregation of PISA 2006	Aggregation of PISA 2006	Aggregation of PISA 2006	Factor analysis of column 1, 2, and 3	Eurydice (2004); Wössmann et al. (2009,123)

Appendix B. Dependent variables and control variables.

	Youth unemployment ratio	School-to-work transition (years)	Average score on math test	Class-based difference on math test	Civic participation	Government spending on education	EPL
Argentina			388.068				
Australia	2.60		514.340	82.35	0.28	13.77	1.38
Austria	1.70	2.00	495.909	92.44	0.25	11.01	2.41
Belgium	2.60	2.90	515.272	118.30	0.15	12.38	2.61
Brazil	2.90		385.814	99.71	0.07	16.18	2.27
Bulgaria	2.20		428.066	126.19	0.02	11.61	
Canada	2.10		526.805	64.81	0.35	12.55	1.02
Chile	3.40		421.06	114.35	0.11	16.02	1.93
Colombia			380.848	122.08		14.18	
Croatia			459.939				
Cyprus	2.80				0.07	9.45	
Czech Republic	2.60	3.00	492.814	151.62	0.13	10.51	2.32
Denmark	1.80	2.80	503.278	91.62	0.42	15.46	1.91
Estonia		4.30	512.104	74.95		13.94	2.39
Finland	2.60		540.504	59.60	0.36	12.60	2.29
France	2.60	2.80	496.782	128.48	0.34	10.59	3.00
Germany	1.20	1.50	512.778	73.04	0.12	9.73	2.63
Greece	3.30	4.40	466.096	97.77		9.20	2.97
Hong Kong	2.40		554.528	80.25		22.99	
Hungary	2.50	4.70	490.170	156.63	0.04	10.92	2.11
Iceland	2.90		506.669	63.06		17.97	2.11

Indonesia	6.70	4.00	371.301	75.23		14.87	3.02
Iran						22.85	
Ireland	2.20		487.136	77.32	0.27	13.93	1.39
Israel	2.40		446.864	81.77	0.21	13.27	1.88
Italy	3.70	3.40	482.908	86.41		9.21	2.58
Japan	2.10		528.993	70.03	0.07	9.51	1.73
Jordan			386.664	81.21		20.60	
Korea (Rep.)			546.228	103.34	0.29	15.21	2.13
Latvia	2.00		481.954	80.88	0.10	13.28	

Appendix B continued.

Liechtenstei			536.048	107.25			
Lithuania			476.602	101.09		14.41	
Luxembourg	3.20	2.60	489.067	111.99		9.82	3.39
Macedonia						15.62	
Malaysia				86.34		18.24	
Malta				90.70		14.86	
Mexico	3.00		418.509	91.92	0.08	25.61	3.23
Moldova				93.65		20.18	
Morocco						26.13	
Netherlands	2.30	2.00	525.836	102.39	0.25	11.98	2.23
New Zealand	3.00		519.301	111.00	0.30	19.67	1.16
Norway	4.10		497.956	81.63	0.38	16.19	2.65
Philippines	3.10				0.16	16.66	
Poland	2.60	3.40	494.803	113.71	0.05	11.99	2.41
Portugal	2.80	3.80	486.888	134.33	0.09	11.34	3.05
Romania			427.079	101.24		11.78	
Russian Fed.	2.40		467.812	96.18	0.03	12.94	1.80
Singapore			562.019	126.88		15.27	

Slovakia	2.40	2.80	496.683	147.25	0.14	10.24	2.13
Slovenia	3.20		501.472	109.4	0.21	12.77	2.76
South Africa						17.65	1.35
Spain	2.30	4.40	483.493	103.12	0.14	11.12	3.11
Sweden	3.00	2.80	494.238	91.57	0.24	12.66	2.06
Switzerland	2.30	2.00	533.961	117.96	0.24	16.32	1.77
Taiwan				117.41	0.18		
Thailand			418.584	122.37		25.02	
Tunisia			371.484	92.95		21.46	
Turkey	2.40		445.451	138.54			3.46
United	2.80	2.60	492.414	83.67	0.17	11.90	1.09
United	2.60		487.397	110.17	0.26	14.71	0.85
Uruguay			426.724	127.00	0.10	11.58	

NOTE. – All sources of the indicators can be found in tshe text. Empty cells indicate missing values on that indicator.

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Aims

The core objective of GINI is to deliver important new answers to questions of great interest to European societies: What are the social, cultural and political impacts that increasing inequalities in income, wealth and education may have? For the answers, GINI combines an interdisciplinary analysis that draws on economics, sociology, political science and health studies, with improved methodologies, uniform measurement, wide country coverage, a clear policy dimension and broad dissemination.

Methodologically, GINI aims to:

- exploit differences between and within 29 countries in inequality levels and trends for understanding the impacts and teasing out implications for policy and institutions,
- elaborate on the effects of both individual distributional positions and aggregate inequalities, and
- allow for feedback from impacts to inequality in a two-way causality approach.

The project operates in a framework of policy-oriented debate and international comparisons across all EU countries (except Cyprus and Malta), the USA, Japan, Canada and Australia.

Inequality Impacts and Analysis

Social impacts of inequality include educational access and achievement, individual employment opportunities and labour market behaviour, household joblessness, living standards and deprivation, family and household formation/ breakdown, housing and intergenerational social mobility, individual health and life expectancy, and social cohesion versus polarisation. Underlying long-term trends, the economic cycle and the current financial and economic crisis will be incorporated. Politico-cultural impacts investigated are: Do increasing income/educational inequalities widen cultural and political 'distances', alienating people from politics, globalisation and European integration? Do they affect individuals' participation and general social trust? Is acceptance of inequality and policies of redistribution affected by inequality itself? What effects do political systems (coalitions/winner-takes-all) have? Finally, it focuses on costs and benefi ts of policies limiting income inequality and its effi ciency for mitigating other inequalities (health, housing, education and opportunity), and addresses the question what contributions policy making itself may have made to the growth of inequalities.

Support and Activities

The project receives EU research support to the amount of Euro 2.7 million. The work will result in four main reports and a fi nal report, some 70 discussion papers and 29 country reports. The start of the project is 1 February 2010 for a three-year period. Detailed information can be found on the website.

www.gini-research.org

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