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Amsterdam Centre
for Inequality Studies



Netherlands Organisation for Scientific Research
Social Sciences

Educational systems and four central functions of education

Research programme funded by NWO Programming Council for
Educational Research (PROO) 2011-2015

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Title and concise summary of the interlinked research project	
Title (English):	Educational systems and four central functions of education
Title (Dutch):	Onderwijssystemen en vier centrale functies van scholing
Summary:	<p>In this project we study the impact of four characteristics of educational systems on four central functions of education. The four characteristics are: differentiation, standardization, vocational orientation, and track mobility. The four functions are to improve equality of opportunity, to enhance efficient sorting and learning, to prepare for labour market allocation, and to socialize into active participation in society (civic engagement). By systematically relating these aspects, we gain knowledge on how educational institutions affect a broad range of targets, which informs policy and science about potential trade-offs in educational policy. Empirically we make use of a wide range of datasets and techniques, and compare countries and school organizations regarding the institutional variation and its consequences for the four core functions of education.</p> <p><i>122 words</i></p>
Titles and summaries of the subprojects within the interlinked research project	
Title project 1:	Educational systems, school characteristics and cognitive achievement (PhD project)
Summary	<p>This project focuses on the explanation of the variance of cognitive achievement of pupils in secondary education by three level characteristics: pupil & parent; school; educational systems. This means that we will analyze the direct and indirect effects of different educational systems of developed societies: societies with educational systems which differ in differentiation, standardization, vocational orientation and track mobility; schools with different constrains and opportunities to teach and learn as a consequence of these educational system characteristics; pupils with different social and cultural background and learning histories within different schools and within different educational systems.</p> <p><i>95 words</i></p>
Title project 2:	Educational systems and the socialization of students into active citizenship (PhD project)
Summary	<p>This project examines the impact of educational institutions on how students are equipped with competencies that foster active participation in society. This part-project studies the impact of the four educational institutions on civic outcomes for students of different educational attainments (participation in voluntary associations, political interest, democratic attitudes, civic engagement, voting at elections, and trust in institutions). We hypothesize that differentiation and vocational orientation magnify variations among students of different tracks, whereas standardization and track mobility decrease variation. This is examined using different designs and datasets.</p> <p><i>86 words</i></p>
Title project 3:	Educational systems, skills and labour market outcomes (post-doc project)
Summary	<p>In this project we focus on the allocation function. We will explore the following questions: Are school-leavers and graduates equipped with relevant skills to enter the labour market? How do these skills affect labour market outcomes? How are these outcomes distributed across gender, ethnicity and social background? How are the acquisition of the skills and labour market outcomes affected by characteristics of the educational system? We will use international comparative datasets to explore the effect of the four institutional characteristics (differentiation, standardization, vocational orientation and track mobility) in framing the allocation function of education.</p> <p><i>94 words</i></p>

Title project 4: Policy trade-offs in educational design (postdoc project)
Summary This project focuses explicitly on the policy trade-offs between different functions of education. This focus is realized in three steps. First we examine a combination of multiple functions (equality & efficiency, equality & labour market allocation, and equality & civic engagement), and see whether institutions have differential effects on these. Second, we translate findings of the whole project into policy implications. Third, a thorough empirical analysis of the position of the Netherlands will be carried out, to see if the Netherlands is an 'outlier' or fits into the general picture provided by the cross-national comparisons. <i>95 words</i>

INTERLINKED PROJECT

Research proposal

Scientific quality

Problem definition

Two important questions concerning the role of education in society are: what could education achieve? And: does it do that well? The answer to the first question can be given by associating four central functions to education, on an abstract level prevalent in most educational systems (Peschar & Wesselingh 1999, Borghans et al. 2008; Van de Werfhorst & Mijs 2010):

1. To promote equal opportunities to children of different backgrounds (*the equal opportunities function*).
2. To sort students efficiently according to their talents and interests (*the selection function*). The selection function implies that efficient learning is achieved when the sorting process is optimized. The 'total' production of knowledge and skills is then optimized (given a particular budget for education).
3. To prepare for the labour market (*the allocation function*). This function implies that education teaches skills that are productive for work, and thereby helps school leavers in the process of being allocated to different labour market positions, and employers in optimizing their production.
4. To socialize students and pupils into active citizenship (*the socialization function*). Schooling can have an active role in the formation of active and participating citizens, and it can help to promote equality in civic competences (which can not be expected from other socializing agents such as parents).

The answer to the question whether education does well in realizing those functions is, we expect, dependent on the institutional features of countries in which youngsters integrate. Within a given educational institutional structure, some of these four functions may be more easily achieved than others. For example, a system that optimizes on efficient learning may perform less well when it comes to equality of opportunity (Brunello & Checchi 2007). This implies that, in the design of educational institutions,

governments face policy trade-offs when a particular institution serves one function but harms another.

This project aims to study the relationship between educational institutions and the four core functions of education. We follow a heuristic framework proposed by the main applicant (Van de Werfhorst 2007; Van de Werfhorst & Mijs 2010), in which four types of educational institutions are examined in relation to the four functions of education. Following comparative educational research (Kerckhoff 2001; Shavit & Müller 1998; Hanushek & Wößmann, 2005; Horn 2009) we distinguish the following four types of institutions:

- The *differentiation* of the system into different tracks or school types;
- The *standardization* of the system in terms of accountability and centralization;
- The *vocational orientation* of the system;
- The extent to which students can move between tracks or school types (*track mobility*).

The central research question is:

How and why does the educational institutional structure affect the four functions of education, taking into account the relevant characteristics of individuals, schools, and societies?

We focus on cross-nationally comparative research in all part-projects.

The heuristic framework is summarized in table 1. Each cell of table 1 illustrates the hypothesized relationship between a particular institution and one of the four core functions of schooling. A (+) indicates that strengthening this particular institution is expected to improve the respective core function, and a (--) indicates that we expect a negative relationship between the institution and the core function.

Table 1: Educational institutional variation and central functions of education: a heuristic framework

Central functions of education				
Educational Institutions	<i>Improve equality of opportunity</i>	<i>Sort efficiently to maximize learning</i>	<i>Prepare for labour market allocation</i>	<i>Socialize into active participation in society</i>
<i>Differentiation</i>	--	+	+	--
<i>Standardization</i>	+	+/--	+	+
<i>Vocational orientation</i>	--/+	+	+	--
<i>Track mobility</i>	+	+	+	+

Thus far research has mostly focused on one single function (e.g. by examining the impact of differentiation on inequality, or the impact of vocational education on employment). Some studies have examined trade-offs by researching two outcomes that

may be in conflict with each other, in particular with regard to the impact of differentiation on equality and efficiency. However, to gain knowledge on potential trade-offs in educational design it is important to focus on all of the four central functions of schooling, and not on a sub-set of them. To this aim, the fourth 'integrative' project focuses explicitly on trade-offs between the four outcomes, in contrast to the first three sub-projects that focus more exclusively on a selection of the outcomes/functions.

General hypotheses

Although hypotheses are formulated more explicitly in the sub-project proposals, some general hypotheses are guiding the overall project.

1. *Differentiation* increases variability between students. As a consequence, equality of opportunity is reduced. Yet, learning may take place more effectively and efficiently because of the (contested) idea that homogeneous groups are beneficial to learning (or the gains of the high-achievers are higher than the losses of the low-achievers). A higher variability between students also enhances the visibility of qualifications to the labour market, thereby enhancing the allocation function. But increased variability also means that civic competences are varying more strongly between students in differentiated systems, leading to larger effects of educational attainment on active citizenship (and thus to less democratic equality).
2. *Standardization* reduces variability between schools of the same type and level. This promotes equal opportunities. It may enhance (by setting standards) or reduce (by limiting competition between schools, Wößmann 2007) efficient learning. The visibility of qualifications to employers is enhanced (Shavit & Müller 1998), and standards are set to improve equality of citizenship skills.
3. A *vocational orientation* increases the labour market focus of an educational system. This may reduce (vocational education as a dead end street) or enhance (vocational education as a safety net, Arum & Shavit 1995) equality, promote efficient learning, promote the allocation function, and limit the orientation towards the acquisition of citizenship skills.
4. *Track mobility* improves the matching of students to their educational attainment and achievement. This increases equality, improves efficient learning, and improves the allocation function.

Design and methods

The project focuses on cross-national comparisons using various data sources, including:

- Student achievement data PISA (sub-projects 1, 2 and 4)
- Student citizenship data CIVED 1998 and ICCS 2009 (sub-project 2 and 4)
- Adult surveys including measurements of skills, work outcomes and social participation (IALS, ALL, REFLEX) (sub-projects 2, 3 and 4)
- A novel country-level dataset on the measurement of educational institutions in a wide range of countries, for multiple time periods. Data from OECD, ILO, UNESCO and Worldbank are combined. This dataset is created in the context of the new EU-FP7 project GINI, in which Van de Werfhorst and Daniele Checchi collaborate (www.gini-research.org). (sub-projects 1, 2, 3 and 4).

Combining these datasets we examine how macrolevel indicators affect the outcomes of interest. This is done using mixed (multilevel) models to study impact of national institutions on central outcomes. We will carefully examine differences between random-effects multilevel models and models that include country-level fixed effects (e.g. Brunello & Checchi 2007). In addition to mixed models, we will also employ difference-in-difference models. We combine student data with adult surveys to study changes in central tendency and dispersion in outcomes. Such methods can, under some plausible assumptions, test causal claims about the impact of educational institutions (see Hanushek & Wößmann 2005 for an example).

We will pay particular attention to the Dutch case in comparative perspective, most notably in the integrative sub-project 4.

Multidisciplinary character

The project is multidisciplinary by nature. We bring together expertise from educational studies and comparative stratification sociology for identifying institutional variations; from educational studies to incorporate knowledge on the school as intermediary level of analysis, and on the measurement of test scores; and from economics to study multilevel data with models that improve the possibility to make causal claims about institutional effects, and to study labour market outcomes related to schooling.

The group includes researchers from a department of sociology (Van de Werfhorst, UvA), a department of educational sciences (Karsten, UvA), a research institute in an economics faculty that includes sociologists and economists (Dronkers, Van der Velden, ROA, UM), and a faculty of economics (Webbink, EUR). We aim to publish our results in journals in all three fields. Collaborations between the fields will be made within all four sub-projects as much as possible.

Organisation

For an overview of the impact of institutions on the core outcomes on the proposed scale, it is necessary to work in a large collaborative project, with different sub-projects.

The *vertical integration* is warranted, firstly, because all four sub-projects start from the general heuristic framework laid out in table 1. Each sub-project focuses centrally on a selection of the core functions (one or two), whereas all four institutional dimensions are studied as much as possible. Secondly, all sub-projects use similar sorts of data and quantitative techniques. Thirdly, all sub-projects make use of, and contribute to, the country-level dataset that measures the four dimensions of educational institutions, and control variables for the countries we study. This way we ensure that the sub-projects use the same indicators at the country-level.

The *horizontal integration* is promoted, firstly, by the fourth sub-project, which aims to integrate the several core functions and to explicitly study policy trade-offs between them, and to use different sorts of datasets than used in the sub-projects to test the same hypotheses. Secondly, horizontal integration is warranted by intensive collaborations between the sub-project members. We organize four meetings per year with the whole group to discuss papers and progress, and organize two larger workshops with a larger audience as well. Thirdly, and relatedly, supervisors of the sub-projects are

in some cases involved in the supervision of more than one project (Van de Werfhorst and Dronkers are both involved in two sub-projects).

Scientific significance

Scientific importance, originality, and scientific added value

Past research has mainly focused on inequalities and efficient sorting. A more comprehensive understanding of institutional effects on different outcomes is lacking. Another innovative aspect of this program is the integral study of educational system, school and individual characteristics. The combination of system- and school-characteristics is until now rare in the study of educational systems.

Expected scientific output

We expect:

- o two PhD dissertations,
- o at least 16 peer-reviewed articles,
- o one edited book
- o two VENI/VIDI proposals by postdocs to ensure continuation of research
- o two large workshops with open calls for proposals
- o one final conference with Onderwijsraad, ministry of Education, Culture and Sciences, and umbrella organisations of schools.
- o 16 internal workshops.

International orientation (optional)

The international orientation is strong for our group. We are involved in different European research projects (EQUALSOC, GINI, GOETE, REFLEX, and the OECD led PISA and IALS/ALL/PIAAC projects), the research itself is cross-nationally comparative and will lead to strong visibility in the international arena. The applicants have since long been active in international research and have worked abroad strengthening our international networks.

Strategic and practical significance

Programme-related significance

The proposed research is directly related to the research programme. The proposal matches very strongly to the theme of "Features of educational systems and central functions of education", although our findings will also be relevant for the theme "Education's pedagogic functions" in particular in relation to social cohesion (sub-project 2).

Practical significance

The practical significance of our findings is large, as we will gain a comprehensive understanding of the pros and cons of particular educational institutions. Our findings can contribute to educational policy because policy makers more clearly see how desirable effects may be related to undesirable side-effects. We will link with the policy field in a large final policy conference.

Work and dissemination plan

Work plan

We hire two phd students and two postdocs for the sub-projects. Van de Werfhorst and Dronkers will be actively involved in overall coordination and substantive bridging between the parts. A lot of interaction between the sub-projects will take place, with regular meetings with all involved researchers, to ensure coherence of the whole project.

Dissemination plan

Workshops, scientific articles, publicity through forum of journalists affiliated to AMCIS (directed by Van de Werfhorst, www.AMCIS.eu), conference presentations, connection to other networks in Europe. We will disseminate our results to the academic community, policy makers, and the public.

SUB-PROJECT 1

Educational systems, school characteristics and cognitive achievement

Supervision: Prof.dr. J. Dronkers, Prof.dr. H.G. van de Werfhorst

PhD project Research Centre for Education and the Labour Market (ROA), Maastricht University

Problem definition

This project focuses on the explanation of the variance of cognitive achievement of pupils in secondary education by three level characteristics: pupil & parent; school; educational systems. There exist recently (Kerckhoff, 2001; Shavit & Muller, 1998; Hanushek & Wößmann, 2005; Horn, 2009; Dunne, 2010) agreement among scholars that the cognitive achievement of pupils in different educational systems varies systematically, but also that the effect of parental background on this cognitive achievement varies between educational systems. However, there is less agreement about the interpretation of these variations between educational systems. An important reason for these interpretation and explanation problems of the effects of educational systems might be the omission of an important group of characteristics which transmit educational system features into constrains and opportunities for pupils to learn and for teachers to teach: school characteristics. Since Coleman (1966) the study of the effects of school characteristics on educational outcome has flowered. As Scheerens & Bosker (1997) have summarized, the most important school characteristics are social composition of the pupil population; grade or curriculum-level, curriculum-type, time-on-task of teachers and pupils, quality of the teachers and school-climate. All these school characteristics are not independent of the educational systems, in which they operate. For instance, the differences in the social composition of secondary schools are much larger in a highly differentiated educational system (like the Dutch or German system), compared with a hardly differentiated system (like the Norwegian or the Swedish). Consequently, the effects of the social composition of the school on cognitive achievement might be quite different between educational systems (Dunne, 2010). However, until very recently the

level of school was fully ignored by the study of the effects of educational systems on cognitive achievement. However Dunne (2010) and Dronkers (2010) showed independently that school characteristics like school composition and ethnic and social-cultural diversity in schools have substantial different effects and implications in different educational systems for educational achievement.

Therefore, we will incorporate these new insights and investigate the cognitive achievement of 15-year olds in different educational systems of developed societies with a three level perspective: societies with educational systems which differ in differentiation, standardization, vocational orientation and track mobility; schools with different constrains and opportunities to teach and learn as a consequence of the school characteristics; pupils with different social and cultural background and learning histories. This three-level perspective is also useful to overcome the current interpretation and explanation problems related with a two-level approach.

It is evident that the inclusion of the school-level in the study of educational systems can be very useful for policy-makers. The change of an educational system might also imply the change of some school features, which might not be possible in the context of Dutch educational system and laws or be non-advisable because of the negative side-effects of such changes.

In the analysis we will concentrate on the general research question of the overall project. We will test at least the following hypotheses in line with the main research proposal:

1. The effect of parental background on cognitive achievement differs with the level of differentiation of educational systems. In highly differentiated educational systems the effect of parental background manifest itself mainly by between-school curriculum variation, while the within school variation effect of parental background on cognitive achievement is relatively small. In hardly differentiated educational systems the effect of parental background manifest itself mainly by within-school variation, related to the differences in social composition of schools, while the between school variation effect of parental background on cognitive achievement is relatively small (for arguments see Dunne 2010).
2. The effect of standardization of curriculum and examination-procedures within an educational system on the level of cognitive achievement is positive and largest for pupils with lower parental background and for pupils attending lower scaled school types and curricula, because they are at risk of lowering educational standards.
3. The existence of a vocational stream or type in an educational system improves the cognitive skills of the lowest achieving 25% part of the 15-year pupils, because such a vocational stream is a clear incentive of educational performance.

Design and methods

We will make use of the PISA data, which allows us to apply this three-level-approach (countries; school; pupils). The OECD collects the PISA data since 2000 by regular waves with a three-annual interval. These waves are a cross-sectional survey of 15-year old pupils in all OECD countries (and partner countries) and measure the reading, mathematical and sciences skills of these pupils with the same instrument. The pupils

answer also questions on their parental background and their relation to schools, learning, the curriculum, etc. The principals of the sampled schools answer a large number of questions about their school and its functioning. We contribute to the measurement of educational system characteristics in our collaboration with the EU GINI project (see data section of interrelated project). These data will be combined with individual PISA data. Given that educational system features are related with social and economic characteristics of these societies (GDP, social welfare system, etc), which might also be responsible for cross-national variation in educational achievement, we shall also add these as covariates. PISA data have also draw-backs: they are not longitudinal but cross-sectional, which makes causal inferences difficult; retrospective data about the educational career of the pupils is almost non-existent; the school features are only based on the attitudes of the school principal instead of the teaching staff; the school-internal differentiation in classes, tracks, etc is only partly available and it is not easy to relate pupils to these differentiation. But the big advantage of the PISA data for this project is their cross-national nature and the high level of standardization and comparability of the indicators. The high level of correspondence in data collecting of the various PISA waves also allows data pooling to overcome the problem of small number. Moreover, we will model country fixed effects in order to remove unobserved country variation when studying interaction effects between macrolevel indicators and microlevel variables (Brunello & Checchi 2007).

SUB-PROJECT 2

Educational systems and the socialization of students into active citizenship

Supervision: Prof.dr. H.G. van de Werfhorst, prof.dr. S. Karsten

PhD project Amsterdam Centre for Inequality Studies, Amsterdam Institute for Social Science Research, University of Amsterdam

Problem definition

Comparative research on educational institutional effects has thus far focused on three of the four core functions of schooling, and has neglected the fourth function: socialization into active participation and civic engagement. Some studies have been done on how civic education varies across different tracks of education within countries (Ten Dam & Volman 2003; Niemi & Junn 1998). Additionally, cross-national variations in students' political interest, political efficacy, social trust, democratic values, and voluntary participation are usually explained by differences in political systems and in the ways in which governments use the schooling system for democratic socialization (Hahn 1998, 1999; Torney et al. 1975), rather than by institutional and structural variations across educational systems.

This sub-project investigates whether educational institutional factors have an influence on the socialization function of education, by focusing on outcomes in the realm of active citizenship. More specifically, we address the question whether differentiation, standardization, vocational orientation and track mobility affect civic outcomes, including

participation in voluntary associations, political interest, democratic attitudes, civic engagement, voting at elections, and trust in institutions. In this research, we differentiate between effects of (individual) track/school type, and effects of institutions, in particular with regard to the way in which institutional characteristics magnify or diminish variations across tracks.

With regard to track effects, it is hypothesized that students in the (pre-)vocational track have lower levels of civic engagement than students in the general/academic track. Several explanations for such variations will be tested, which follow from the political socialization literature (Verba et al. 1995 Brady et al. 1995; Hilligus 2005). First, track effects may be spurious because of *selection* on social or ethnic background, and earlier ability. Second, tracks differ in their content of civic education (referring to the '*skills*' explanation of Verba et al. 1995), with more limited attention in vocational tracks than in general/academic tracks. This can be expected because fewer general skills are acquired that enhance active citizenship (such as literacy), and because less attention can be devoted to special civic education classes (e.g. social studies, history). Third, tracks differ because the '*recruitment networks*' may differ across tracks. We examine this hypothesis by looking at class and/or school composition in terms of social and ethnic background, assuming that networks in schools with more highly educated parents are more supportive for active participation.

With regard to institutional effects, we address the question whether differentiation, standardization, vocational orientation and track mobility affect differences across students in different tracks. We hypothesize that track differences are magnified in strongly differentiated systems and in vocationally oriented systems. Separation of students limits interaction and communication between social groups. Communication between groups is held key to promote civic involvement (Dewey 1966[1916]), and separating students on the basis of their learning skills prohibits interaction possibly leading to mutual understanding among diverse groups. Hyland (2006) finds, for example, that heterogeneous classes are conducive to the formation of civic competences. Additionally, a strong vocational sector often involves employers in the design of curricula, and it may not be in their interest to train 'critical' competences that lead to active involvement.

Standardization and track mobility are expected to reduce differences across tracks. Standardization could lead to standards with regard to citizenship education, and track mobility implies that students are educated in different tracks which diminishes differences across tracks.

Design and methods

Empirically the sub-project will do four different kinds of analysis.

Firstly, we will study the IEA International Civic and Citizenship Education Study collected in 38 countries (including the Netherlands) in 2009, and the 1998 predecessor CIVED. Both surveys study citizenship education among 14-year olds, focusing on a wide variety of political/participatory indicators of active citizenship, including attitudes and behaviors, and trust in the government. Using these datasets we will analyze to what extent classroom composition with regard to parental education and minority status affect civic outcomes, and whether standardization reduces this impact.

Secondly, we will use the the CIVED data (14-year olds in 1998) together with the same/similar cohort in the International Social Survey Project data of 2007 (aged in their early twenties by then). Using a difference-in-difference model, we hypothesize that the increase between the surveys in dispersion in civic outcomes is larger, and in the mean lower, in countries that have a strongly differentiated and vocationally oriented education system. Hanushek & Wössmann (2005) employed a similar design with regard to mean and dispersion in academic achievement, and Ammermüller (2005) for inequality of educational opportunity (who also formalized the assumptions, which we will take into consideration too). Highly similar questions on civic engagement have been asked to the CIVED students as to the ISSP adults, which is of course a condition to perform such an analysis.

Thirdly, we use cross-national adult surveys, and select the younger persons below age 40, to study the impact of educational track on a wide range of civic outcomes, under different institutional conditions. The European Social Survey and the IALS and ALL surveys have detailed information about educational attainment, including the vocational or general track that people have done. We examine whether track affects civic outcomes, and hypothesize that differences between tracks are larger in more strongly differentiated and more vocationally oriented systems, and smaller in standardized systems and systems that facilitates track mobility. We will also address the selection into tracks, by controlling for parental/ethnic background and literacy (IALS, ALL). We will also pay particular attention to different kinds of selection models in order to be more confident about the causal impact of track on civic outcomes.

Fourthly, we will study PISA 2006 data to examine the impact of track in different educational systems on environmental attitudes. Environmental concerns can be seen as a new form of civic engagement (Dalton 2009). We examine whether strongly differentiated and vocationally oriented systems magnify differences between tracks in environmental concerns. Moreover, we examine whether countries that do well in terms of academic achievement, do worse on equality in engagement, which would point to a policy trade-off.

SUB-PROJECT 3

Educational systems, skills and labour market outcomes

Supervision: Prof. dr. R. van der Velden & prof. dr. J. Dronkers

Post-doc project Research Centre for Education and the Labour Market (ROA), Maastricht University

Problem definition

In this project we focus on the effects of educational systems on the third function of education: the allocation function. Relevant questions are: to what extent are school leavers and graduates equipped with the relevant skills to enter the labour market? How is the acquisition of the skills affected by characteristics of the educational system? How do these skills affect labour market outcomes such as employment chances and earnings? To what extent do characteristics of the educational system have a direct effect on labour market outcomes through the signalling function? And how are these outcomes distributed across gender, ethnicity and social background?

There are two dominant theoretical notions about why education affects labour market outcomes. The Human capital theory (Becker, 1964) assumes that investment in education makes people more productive. These productive skills are in turn rewarded on the labour market with higher earnings. Characteristics of the educational system like differentiation or vocational orientation are in this view related with an efficient production of skills. The screening theory assumes that education merely sorts people on the basis of existing skills (strong version: Collins, 1979) or that employers use educational credentials as a signal about people's capacities (weak version: Spence, 1973). In this view characteristics of the educational system play a role in reproduction of social inequalities (strong version) or in the development of indicators of general skills, like trainability (weak version). It is now generally assumed that both processes (production of skills and screening) may be present at the same time and that it is important to identify under which conditions or for which levels of education one or the other is more dominant (Bills, 2003; Bol & Van de Werfhorst, 2011).

It is evident that policymakers need to know which of these processes is dominant in the Netherlands (and for which levels of education) in order to be able to evaluate the Dutch educational system in terms of its central functions.

Design and methods

For this project we will make use of two different data sets that will allow estimating the effects of education on skills as well as on labour market outcomes. The first dataset are the international surveys on adult skills IALS and ALL (www.statcan.ca). IALS was conducted in the period 1994-1998 in 23 countries. This survey was repeated with ALL in 2003-2007 in nine countries, which also took part in IALS. The Netherlands participated in both surveys. Both surveys have a large amount of information on personal characteristics (age, gender, ethnic background, socio-economic background, education and training experiences etc), labour market outcomes (employment status, earnings) as

well as tests on prose and document literacy and quantitative literacy/numeracy. Both domains are considered key skills to function well on the labour market.

The second data set that we will use is the REFLEX survey (www.reflexproject.org). This is an international survey among higher education graduates conducted in 2005-2008 in 20 countries, including the Netherlands. Information was gathered some five years after graduation and includes the same personal characteristics as indicated above, characteristics of the higher education program (program type, academic prestige, vocational orientation, institutional linkage), indicators of skill levels (both generic and specific) and labour market outcomes (unemployment experiences, education-job match, skills utilisation and earnings). Both datasets are complementary.¹ The advantage of IALS/ALL is the possibility to use test data to assess the effect of education on generic skills levels for the whole population. The advantage of REFLEX is that we can identify institutional characteristics of the programme level rather than the level of educational system as a whole.

We contribute to the measurement of educational system characteristics in our collaboration with the EU GINI project (see data section of interrelated project), using existing data and typologies (OECD: education at a glance; Schneider, 2009: ES-ISCED; REFLEX country study). In the case of IALS/ALL, we will restrict the analyses to young people aged 16 to 35 to avoid complications due to changes in the educational system as well as effects of experiences after leaving education.

We will use multilevel models in which the effects of the educational system are taken up at the country level, together with some economic controls (standardised unemployment rate SUR; relative change in total employment; growth rate of real GDP; see OECD Economic Outlook).

In the analysis we will concentrate on the research questions outlined above. We will test the following hypotheses:

1. Differentiation and vocational orientation have a positive effect on overall level of skills while at the same time widening the gap in skills levels for different educational qualifications (human capital argument on specialisation).
2. Standardisation increases the association between educational qualifications and skill levels by decreasing the variation within educational qualifications (human capital argument on input variation).
3. Differentiation, vocational orientation and standardisation have an overall positive effect on the labour market outcomes, net of their effects on skills, while at the same time widening differences in outcomes for different educational qualifications (signalling arguments on information).
4. High track mobility will counterbalance the effects of differentiation.
5. Controlled for educational qualifications, personal characteristics like ethnic and socio-economic background have a lower effect on labour market outcomes in countries with high levels of differentiation, standardization and vocational orientation (signalling argument on information). This labour market effect of highly differentiated educational systems might neutralize the strong effect of

¹ We have considered alternative data sets, like the EULFS ad hoc module 2000 and 2009, but decided not to use them as these data lack information on skills and earnings.

socio-economic background on educational attainment in such educational systems before entering the labour-market (see part project 1)

6. Finally we expect that in educational systems with a strong vocational orientation at the lower and intermediate level, the differences in labour market success of high and low qualified is less strong, because of the comparative advantage low qualified may have. In countries where the selection and stratification is mainly based on one dimension (general academic ability), school-leaver's with low qualifications have to compete with higher qualified school-leavers and will always be placed at the end of the labour queue (screening argument).

SUB-PROJECT 4

Policy trade-offs in educational design

Supervision: Prof.dr. Sjoerd Karsten, Prof.dr. Dinand Webbink, Prof.dr. Herman van de Werfhorst

Postdoc project Amsterdam Centre for Inequality Studies, Amsterdam Institute for Social Science Research, University of Amsterdam

Problem definition

Sub-project 4 focuses explicitly on the policy trade-offs between different functions of education. This focus is realized in three steps.

First, this sub-project will *empirically study* multiple functions of education in the same research. This way we examine whether there is empirical evidence supporting the existence of a policy trade-off. Does strengthening one institution support one core function but harms another? We examine at least the following three combinations of outcomes:

- i. Equality of opportunity and efficiency. A policy trade-off would occur if a particular institution decreases equality but enhances efficiency. This has been argued to be the case with external differentiation, although the hypothesis has been refuted (Wößmann 2008a). It remains to be seen whether it is found if we examine the school as organizational level in which allocation on the basis of social class is taking place (similar to what is done in sub-project 1).
- ii. Labour market preparation and equality of opportunity. It is well-known that a strong vocational educational sector helps youngsters in the transition process from the educational system to the workplace (Breen 2005). Yet, there still is a significant social class effect on choice for vocational versus generic types of schooling. If people enrolled in vocational secondary programmes (such as MBO in the Netherlands) have fewer opportunities to enrol in tertiary education, strongly vocationally oriented systems may enlarge social class differences in the attainment of a tertiary-level degree. A trade-off would then appear because strengthening the vocational sector and external differentiation may enhance the

labour market signalling of education, but at the same time magnify inequalities. This trade-off has never been examined within the same research framework; thus far we can only hypothesize the possibility of this trade-off by comparing two different strands of literature.

- iii. Labour market outcomes and civic engagement. It may be that educational systems that perform well in the preparation for the labour market perform worse when it comes to the citizenship task of schooling. This could be the case if early selection in the educational system, and a strong vocational orientation, both lead to improved labour market signalling but at the same time increase variation in citizenship competences and civic engagement.

The second aim of this sub-project is to translate the findings on different functions into *policy implications*. So whereas the first element of this sub-project mentioned above carries out empirical research on multiple functions, with this second aim we more specifically address policy implications relating to standardization, differentiation & track mobility, and vocational orientation. Contrary to earlier policy-oriented work, we address a broader perspective of positive and negative consequences of strengthening a particular educational institution, based on research done in this integrated project and by other scholars.

Thirdly, special attention will be given to the position of *the Netherlands* in the cross-national comparisons. Are the outcomes (headed under the four functions) in the Netherlands as one would expect on the basis of its institutions? Or is the Netherlands an 'outlier' with regard to the outcomes of interest? Most existing cross-national research shows findings with regard to the broad association between institutions and outcomes, and also in sub-projects 1-3 this will be done. Unfortunately, existing research often forgets to provide information about the position of individual countries. By systematically examining the position of the Netherlands in the broad cross-national picture about educational systems, this sub-project helps to eliminate this shortcoming. Particularly in the context of education policy it is relevant that we can scrutinize the position of the Netherlands, either as an 'outlier' or as a typical example of the patterns found. A rigorous multilevel residual analysis will be done to examine this.

Design and methods

This sub-project uses the same data as the other projects. However, more attention will be devoted to policy implications, both in general and specifically for the Netherlands. We will investigate whether we can use or develop mixed models to deal with two micro-level dependent variables simultaneously, as the error terms can be assumed to correlate. Similar as with other sub-projects, we will carefully examine different multilevel designs, in order to test for normality of country-level (and joint level) residuals, and come with solutions if we encounter problems in this regard.

With regard to the policy implications the design is to scrutinize findings of our larger project, and relate it to other studies that have been done. The heuristic framework of the whole project helps to organize such a broader perspective. Earlier studies have led to conclusions relating to strengthening or weakening particular institutions because of the relationship with one, or at most two of the core functions. For

instance, in the Netherlands it has been argued since long that we should reduce differentiation because it leads to more inequality. Sometimes it is argued that the expected 'gains' in terms of efficient (thus maximizing) learning are not there, which further substantiates opinions against differentiation. But the judgement of the desirability of such an institutional change should be made in the context of *all four* core functions, including plausible 'gains' in terms of allocation to the labour market, and 'losses' in terms of civic engagement. Only if politicians and policy makers are informed on the implications of institutions on all four functions, they can weigh the different functions and decide what they want to achieve.

With regard to the position of the Netherlands in the cross-national comparison, we carry out residual analysis with regard to country-level residuals in multilevel models.

References

- Ammermüller, A. (2005). Educational Opportunities and the Role of Institutions. *ZEW Discussion Paper 05-44*.
- Arum, Richard and Yossi Shavit. 1995. "Secondary Vocational Education and the Transition from School to Work." *Sociology of Education* 68: 187-204.
- Becker, G.S. (1964), *Human Capital*, New York: National Bureau of Economic Research.
- Bills, D. (2003), Credentials, Signals and Screens: Explaining the Relationship between Schooling and Job Assignment, *Review of Educational Research*, 73, 441-70.
- Bol, T. & Van de Werfhorst, H.G. (2011). Signals and Closure by Degrees: The Education Effect Across 15 European Countries. *Research in Social Stratification and Mobility*, accepted.
- Borghans L, Van der Velden R, Büchner C, Coenen J, Meng C. 2008. Het meten van onderwijskwaliteit en de effecten van recente onderwijshervormingen. Deelonderzoek Parlementair Onderzoek Onderwijsvernieuwingen, Tweede Kamer der Staten-Generaal, Den Haag
- Brady, H. E., Verba, S., & Schlozman, K. L. (1995). Beyond SES: A Resource Model of Political Participation. *American Political Science Review*, 89(2), 271-294.
- Breen, Richard. 2005. "Explaining Cross-national Variation in Youth Unemployment: Market and Institutional Factors." *European Sociological Review* 21:125-134.
- Brunello G, Checchi D. 2007. Does school tracking affect equality of opportunity? New international evidence. *Economic Policy* 22:781-861
- Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A., Weinfield, F. D. & York, R. D. (1966). *Equality for educational opportunity*. Washington D.C.: U.S. Government Printing Office
- Collins, R. (1979), *The Credential Society: An Historical Sociology of Education and Stratification*. New York: Academic Press.
- Dalton, R. J. (2009). *The Good Citizen. How a Younger Generation is Reshaping American Politics*. Washington DC: CQ Press/Sage.
- Dam, G. T. M. ten, & Volman, M. L. L. (2003). A Life Jacket or an Art of Living: Inequality in Social Competence Education. *Curriculum Inquiry*, 33(2), 117-137.
- Dewey, J. (1966[1916]). *Democracy and Education*. New York: MacMillan/The Free Press.
- Dronkers, J. (2010). *Positieve maar ook negatieve effecten van etnische diversiteit in scholen op onderwijsprestaties? Een empirische toets met internationale PISA-data*. Inaugural lecture given 17 June 2010 at the acceptance of the position of professor of International Comparative research on educational performance and social inequality in the School of Business and Economics of the University Maastricht.
- Dunne, A. (2010). *Dividing Lines: Examining the Relative Importance of between- and within-School Differentiation during lower Secondary Education*. Ph.D. European University Institute (Florence).
- Hahn, C. L. (1998). *Becoming Political. Comparative Perspectives on Citizenship Education*. Albany, NY: SUNY Press.
- Hahn, C. L. (1999). Citizenship Education: An Empirical Study of Policy, Practices and Outcomes. *Oxford Review of Education*, 25(1-2), 231-250.
- Hanushek EA, Woßmann L. 2005. Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence Across Countries. *Economic Journal* 116
- Hillygus, D. S. (2005). The MISSING LINK: Exploring the Relationship Between Higher Education and Political Engagement. *Political Behavior*, 27(1), 25-47.
- Horn D. 2009. Age of Selection Counts: A Cross-Country Analysis of Educational Institutions. *Educational Research and Evaluation* 15:343-66

- Hyland. (2006). Detracking in the social studies: A path to more democratic education? *Theory into Practice*, 45(1), 64-71.
- Kerckhoff AC. 2001. Education and Social Stratification Processes in Comparative Perspective. *Sociology of Education Extra Issue*: 3-18
- Niemi, R. G., & Junn, J. (1998). *Civic Education. What Makes Students Learn*. New Haven: Yale University Press.
- Peschar JL, Wesselingh AA. 1999. *Onderwijssociologie: een inleiding. (2nd revised edition)*. Groningen: Wolters-Noordhoff
- Scheerens, J. & Bosker, R. (1997). *The Foundations of Educational Effectiveness*. Kidlington/New York/Toyko: Pergamon.
- Schneider (2009), Confusing credentials, University of Oxford: Ph.D thesis.
- Shavit Y, Müller W, eds. 1998. *From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations*. Oxford: Clarendon Press
- Spence, M. (1973), Job Market Signalling, *Quarterly Journal of Economics*, 87, 1, 355-374.
- Torney, J. V., Oppenheim, A. N., & Farnen, R. F. (1975). *Civic Education in Ten Countries. An Empirical Study*. New York: Wiley.
- Verba, S., Schlozman, K. L., & Brady, H. E. (1995). *Voice and Equality: Civic Voluntarism in American Politics*. Cambridge: Harvard University Press.
- Webbink, D, Wolf, I de, Woessmann, L, Elk, R. van, Minne, B. & Steeg, M. van der (2009). *Wat is bekend over de effecten van kenmerken van onderwijsstelsels? Een literatuurstudie*. Den Haag: CPB.
- Werfhorst, Herman G. van de 2007. "Onderwijsinstaties in Nederland: gelijkheid, efficiëntie, allocatie en burgerschap?" in *Sociale Kaart van Nederland. Over Maatschappelijke Instaties*, edited by J. W. Duyvendak and M. Otto. Assen: Boom Onderwijs.
- Werfhorst, Herman G. van de and Jonathan J.B. Mijs. 2010. "Achievement Inequality and the Institutional Structure of Educational Systems: A Comparative Perspective." *Annual Review of Sociology* 36: in press.
- Wößmann, Ludger. 2007. "International Evidence on School Competition, Autonomy and Accountability: A Review." *PEABODY JOURNAL OF EDUCATION* 82: 473-497.
- Wößmann, Ludger. 2008a. "How Equal are Educational Opportunities? Family Background and Student Achievement in Europe and the US." *Zeitschrift für Betriebswirtschaft* 78: 45-70.