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MAKING THE MOST OF NORWEGIAN SCHOOLS

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ABSTRACT/RÉSUMÉ

Making the most of Norwegian schools

Traditionally, the Norwegian compulsory education system has focused strongly on the linked goals of equal opportunities to learn, comprehensive and inclusive education. While some of these objectives have been met successfully, a number of educational outcomes, notably measures of pupil performance at the end of compulsory schooling, are unsatisfactory. Given the significant resources devoted to education, Norway's modest performance on certain measures suggests that resources are used inefficiently. There are many possible routes to improve efficiency. This paper focuses on teaching quality, school autonomy, accountability and the level and composition of spending. Consistent policy actions should be taken in these areas, taking into account the multi–level structure of governance of the Norwegian education system.

JEL classification: I21; I28
Key words: cost-efficiency; school governance; Norway; PISA data

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Optimiser la performance des établissements scolaires norvégiens

Le système de la scolarité obligatoire en Norvège met traditionnellement l'accent sur deux objectifs liés : l'égalité des chances face à la formation et l'absence de rupture et de sélection dans le parcours éducatif. La Norvège enregistre un certain nombre de succès sur ces deux fronts ; mais certains résultats comme la performance des élèves mesurée en fin de cycle obligatoire laissent à désirer. Compte tenu du volume important de ressources consacrées à l'éducation, la modestie des résultats obtenus par rapport à certaines mesures suggère une utilisation inefficiente des ressources. Plusieurs voies sont envisageables pour améliorer la situation. La présente étude s'intéresse à la qualité de l'enseignement, à l'autonomie des établissements, à la transparence, ainsi qu'au niveau et à la composition des dépenses. Dans tous ces domaines, des mesures publiques cohérentes s'imposent, surtout si l'on prend en compte les niveaux multiples de gouvernance au sein du système éducatif norvégien.

Classification JEL : I21 ; I28
Mots clés : efficacité ; gouvernance des écoles ; Norvège, données PISA

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MAKING THE MOST OF NORWEGIAN SCHOOLS

by Romina Boarini[1]*

1. Norway spends 6.2% of GDP on publicly–financed education, compared with an OECD unweighted average of some 5.8%, or 5% when private finance (which scarcely exists in Norway) is excluded. This reflects high income levels, the currently healthy state of the public finances and the importance that Norway attaches to a comprehensive state education system. Inclusion and equity are key goals of the Norwegian education system. Every pupil should receive education in accordance with her capabilities and needs, and an equal opportunity to learn and develop skills for life should be given to everybody, irrespective of their socio–economic conditions and geographical location. Such indicators as are available do indeed show that education contributes to the egalitarian nature of Norwegian society and its relatively high degree of social mobility.

2. Norway can afford relatively expensive public education, but it should not neglect value for money; education must provide the human capital needed to sustain growth in the future, including maintaining and improving healthy innovation processes. Since the publication of the first PISA results in 2001 showing only average performance in Norway, and even more so with evidence that relative performance has been declining since then, policymakers have recognised that there may be a problem. Responsibility for the management of compulsory education rests with municipalities, as well as most of funding, so that direct action by central government is restricted. This can intervene in certain areas such as teachers' training standards, but crucially it can set the environment in which municipalities and schools operate. Recently, the freedom of municipalities to choose their methods has allowed an experiment in potentially radical change in Oslo.

3. This paper, concentrating on the years of compulsory education, which absorb two thirds of education expenditure, takes a look at how Norway spends its money and investigates how the structure of incentives and accountability may have generated insufficient focus on students' performance, leading to deteriorating outcomes even though many people in the system (pupils, teachers and administrators) believed it was performing well. An introductory section gives a brief outline of the education system, and discusses indicators of educational attainment and measures of efficiency. Subsequent sections look at the quality of teachers, teaching, and teaching time before discussing the incentives faced by teachers and schools, and the structure of accountability within which they operate. It concludes that there may be ways of designing incentives to spend money better so as to get improved outcomes with existing resources, as well as room for cuts in expenditure which would not impair educational outcomes and which could release resources for use elsewhere in the system. These conclusions are supported by the results of an econometric exercise presented in the companion paper (Boarini and Lüdemann, 2009), which looks at the main policy determinants of learning outcomes in OECD countries, as measured by PISA scores.

[1] OECD Economics Department. The author would like to thank Paul O'Brien, Patrick Lenain, Jørgen Elmeskov, Andrew Dean and Gregory Wurzburg for their valuable comments and inputs to this study. The empirical analysis was done together with Elke Lüdemann. Heloise Wickramanayake provided excellent secretarial assistance. The views expressed here are those of the author and do not necessarily represent those of the OECD or its member countries.

The main features of Norwegian compulsory education

4. Norwegian compulsory education is very comprehensive, there is no streaming or other educational tracking before the upper–secondary schools (Box 1). An equal importance is attached to guaranteeing the same conditions for studying in every part of the country: almost all local communities have their own school, sometimes with very small classes or classes pooling different grades. Pupils generally attend the closest school to their residence, even if in principle they can apply to a different school. Few families use this option because in practice the choice is very limited.

5. Norwegian education is under the responsibility of both central and local authorities. The Ministry of Education and Research is responsible for setting the general guidelines of the education system and for overall supervision. Management and administrative responsibility in compulsory schooling is exercised by municipalities, while counties have an analogous role for upper–secondary system. The general framework for curricula, including goals, priorities, structure and organisation of learning, is established at central level but responsibility for implementation is left at local level. All primary and lower–secondary schools are publicly funded and a very small minority (4.5%, 2% of total students) is privately managed. Funds are provided by the State to lower–level government as a block–grant which covers education and other social expenditures (notably health care, child and elderly care), while local authorities are free to decide on the allocation of resources to schools. On average municipalities spend 38% of their budget on education, with a minimum of 15% and a maximum of 71%.

6. In the last ten years Norway has undertaken a number of reforms of the education system. The most recent, known as Knowledge Promotion, was launched in 2006 and is to be implemented over the years up to 2009 (Box 2). The reform, together with other national initiatives[1], addresses some of the main weaknesses identified later in this study, planning to redefine curricula, strengthen teachers' and principals' competences, improve benchmarking and deepen the treatment of Mathematics, Science and Technology subjects. As with some of the earlier reforms, however, measures to meet the targets seem insufficient, and some of the targets themselves lack focus. In the White paper from June 2008 the Government presents goals that should be pursued from national level to school level (see Box 3).

Box 1. The Norwegian primary and secondary education system

Children start primary school, *Barnetrinnet* (grade 1 to 7), at the age of six, and lower–secondary school, *Ungdomstrinnet* (grade 8 to 10), at age 13. Pupils go to school 38 weeks a year, five days a week and take on average 19.2 (primary) and 22.4 (lower secondary) 60–minute lessons per week. There is a minimum total number of teaching hours (5120 in primary schools,as from Autumn 2008, 2 556 in lower–secondary, over the 10 years of compulsory schooling) but many municipalities offer more hours than the minimum. Compulsory schooling is fully comprehensive, with no tracking, neither according to ability nor to subjects studied, and neither between nor within schools. Up to grade 7, assessment of pupils is mainly qualitative (pupils receive a quarterly report with a descriptive evaluation of their performance), while from grade 8 onwards explicit grades are awarded, though promotion from one year to the next is automatic. Final exams with marks are carried out at the end of lower–secondary level; again, there is no concept of "failure" in these exams.

Since 2003, when the maximum class size rule was abolished, pupils are organised into "pedagogically suitable groups". In practice, since the Parliament had stressed that this rule was not meant to reduce resources for schools, the average class size remained substantially unchanged. Given the geographical variation of the school districts, there are marked differences in the average size of classes/groups across the country. Geographical variation is also reflected in school size; slightly less than 10% of total students are enrolled in schools with less than 100 pupils and 53% study in big schools (which in Norway mean schools with more than 300 pupils). About 25% of schools are so–called "combined schools" offering both primary and lower–secondary education.

Upper–secondary education comprises two paths: general education (lasting three years), which is more academically–oriented, and the vocational training track (lasting three or four years) which aims at more immediate entry into the labour market. All people between 16 and 19 have a statutory right to upper–secondary education and there are a number of possible pathways for older youths to return to the post–compulsory system if they initially drop out. Today more than half of upper–secondary students are enrolled in vocational education, and the trend of the last

ten years is on the rise. Assessment in upper–secondary education relies on continual assessment and end–of–year examinations (generally externally set and marked). The latter also condition promotion to the following year.

In the last ten years the number of pupils in compulsory school increased by 10%, with the numbers in primary schools increasing by about 7%, while those at lower–secondary level grew more than 20%.

Box 2 The "Knowledge Promotion" reform

The ongoing reform "Knowledge Promotion" was launched in 2006, with the objective of developing "fundamental skills that will enable pupils to participate actively in Norwegian knowledge society". The reform covers both compulsory schooling and upper–secondary education. It aims at further strengthening adapted learning on an individual basis, through new curricula with clearly defined competence goals, more emphasis on basic skills (the ability to read, the ability to do arithmetic, the ability to express oneself in writing; the ability to make use of information and communication technology), but leaves local discretion within a nationally determined framework of subjects and tuition time.[1] The new syllabuses have been worked out for all subjects in the 10 years of compulsory school and for the common subjects in upper–secondary education and training; the new syllabuses specify goals for what pupils should know in various grades. These, however, appear to be flexible: "In assigning such skills targets, the subject syllabuses are expressing high academic ambition for all pupils, who *in varying degrees* should be able to reach the targets that have been set." (emphasis added). The new national curriculum also strengthens "basic values and the view of humanity underlying education". Overall, while the new curricula shift the focus on improving average performance, the principles of equitable and inclusive education continue to be pervasive in the reform. The old curriculum did not define clear standards for average outcome, and the system did not seem to be very ambitious. The new reform is a good step forward to change this culture. However the twofold goal of improving overall performance and preserving equity of education might be very ambitious to reach, and probably more costly.

The main expenditure programme developed under the Knowledge Promotion Reform is the "Kompetanse for utvikling" (Competence for development), a programme which is essentially meant to strengthen teachers' and principals' competences, through in–service professional training. The competency development programme is financed by the central government, with money transferred to municipalities and counties on the basis of the number of teachers (85% of funds), the number of schools (10%) and a fixed fund per county (5%). Municipalities and counties freely decide how to allocate this money, within a national priority framework (in 2007 pupil assessment was added as national priority). Activities undertaken in the context of competence development programme are planned through a document (produced by the municipality/county) which establishes local needs and assigns funds accordingly; these activities are also the subject of a yearly report to the Regional governor. From 2005 to 2008, more than a billion NOK have been allocated to this programme, The competence for development programme has been evaluated by an independent institute (FAFO) in three different stages of its implementation. Overall, the results of this evaluation are mixed (see The Education Mirror 2006 and the section below for a discussion).

1. The new curriculum establishes the distribution of teaching hours across grades of instruction; it also gives local authorities the power to reallocate 25% of teaching time. Teaching time can be changed by principals when "it is likely that it will help pupils attain the goals for their subject as a whole". Any change is conditional on pupils' and families' agreement.

Box 3 White Paper on Quality in Education

The new government White Paper"*Quality in Education*" was launched in June 2008. The white paper addresses the relatively low performance of Norwegian pupils in reading, maths and science. The different initiatives proposed are important necessary steps to improve the quality and efficiency of the Norwegian compulsory education. They are to a large extent in line with the recommendations of this paper.

Resources and performance assessment for early intervention

Research consistently emphasizes the importance of early intervention in order to improve learning outcomes (Heckman 2007, Tayler *et al*. 2007, OECD, 2007b). Policy measures intended to increase the use of early intervention are proposed, including mandatory diagnostic tests in reading and math in grades 1–3, and financing additional teaching resources for following up unsatisfactory results in reading and mathematics. The funding will be combined with a new regulation requiring municipalities to strengthen teaching for students with poor performance in these subjects.

Teacher Quality and School Leadership

The White Paper highlights the importance of teacher quality and school leadership and proposes the systematic use of in–service education of teachers and school leaders, with high priority to training that leads to formal accreditation.

Performance Assessment and Local Accountability

The White Paper proposes measures to further develop and expand the national assessment system, such as national tests in reading, maths and English at grade 9 in lower secondary education, in addition to the present tests at grade 5 and 8. Mandatory diagnostic tests in reading and math will be introduced in the first grade in upper secondary education. In addition, steps are taken to facilitate the use of performance information at the local level. The White Paper also includes proposals for increased local accountability and state support to schools with low performance. Municipalities are required to prepare an annual report on the results of their schools.

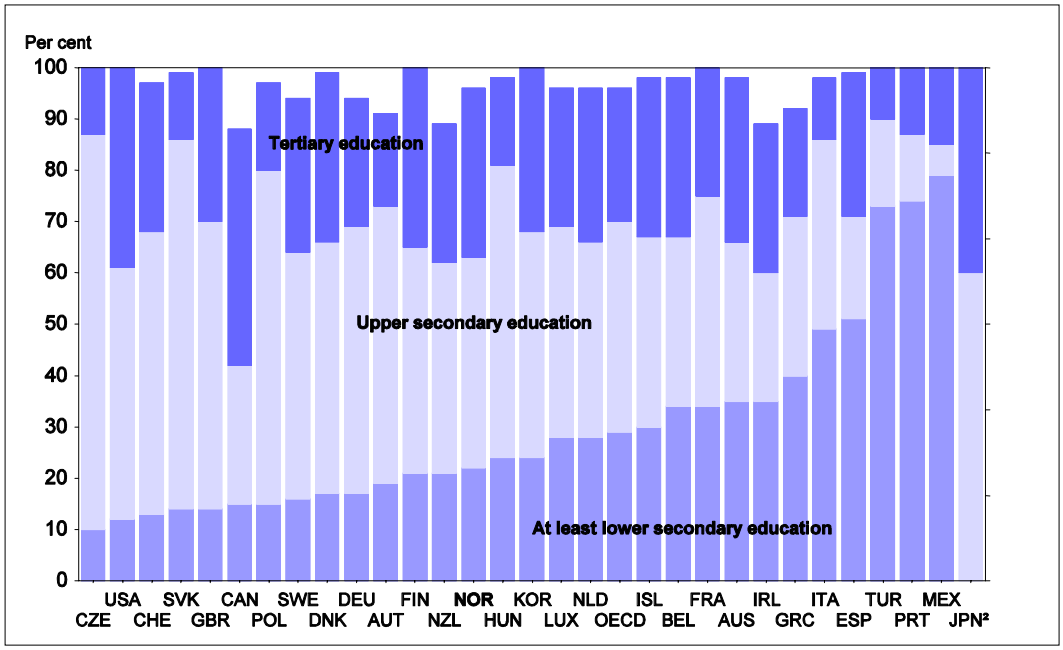
The current stock of human capital is high by OECD standards; will the relative advantage be maintained?

High attainment levels in the adult population

7. On various – admittedly indirect – measures, the stock of human capital is substantial. The average completed years of schooling for the population aged 25–64 is around 14, two years higher than the OECD average. One person in three in the adult population has a tertiary degree (versus one in four for the OECD average), but the number of people with an upper–secondary education is also considerable (Figure 1). By comparison with other OECD countries the relatively high average attainment level is mostly due to the larger share of educated people in the oldest groups of the population (but, as elsewhere, the elderly are on average less educated than young people in Norway). Norway also stands out for having high current graduation rates at upper–secondary levels (and particularly so for general versus vocational programmes). Norway is also one of the countries where gender disparities in educational attainments are the lowest (both for the stock and the flow of human capital).

Figure 1. Education attainment in the adult population[1]

OECD countries, 2005



1. Distribution of the 25 to 64 year old population, by highest level of education attained. The category at least lower–secondary includes both primary and lower–secondary. The category 'post secondary, non–tertiary education' is not included in the chart; therefore the sum is not always 100 per cent.
2. For Japan, upper secondary education is not available as a separate aggregate.

Source: OECD Education at a Glance 2007.

But only modest average performance at age 10 to 15

8. With the exception of two surveys (Bonnet *et al.*, 2002 and the Civic Education Study) which showed good results in English and democratic competence, the majority of international assessment surveys have consistently found that Norwegian pupils perform modestly in various core subjects, like mathematics, sciences and reading (TIMMS 1995, 1999, 2001 and 2003; PIRLS 2001 and 2006; PISA 2000, 2003 and 2006). According to the latest available OECD survey (PISA 2006), Norwegian 15–years old pupils score about 13 points lower in the combined science scale than the OECD average. This is equivalent to saying that the average Norwegian pupil is nearly one third of a school year behind their average OECD counterpart. This is not true at all ability levels: Norway does not have more low–achievers, but rather it has fewer higher–achievers than other OECD countries. The number of pupils at the highest proficiency levels is 50% lower than in the OECD area average; for the second–highest and third–highest levels the gaps are 30% and 20% respectively. Even compared with its Nordic neighbours, and despite the marked similarity of their educational systems, there is a significant performance gap. While Sweden and Denmark perform around the OECD average, Finland is ahead of Norway by the equivalent of two years of school.

9. Most surveys also suggest that there has been a decline in relative performance in recent years. Reading skills of Norwegian pupils went down by 20 PISA points over the last six years, *i.e.* by the equivalent of more than one half of a school year, whereas in Sweden and Denmark the 2000 scores are not significantly different from those of 2006 (Figure 2). In mathematics the fall was much smaller and not significantly different from zero, though the time interval over which the comparison takes place is shorter. The TIMMS[2] 2003 report also highlighted a worsening since 1995 for students of both grade 3 and grade 7 students (respectively 10–year old and 14–year old pupils) in both mathematics and sciences. Finally, PIRLS 2006[3], which tests reading abilities among grade 4 pupils, shows a decline among low–achievers and high–achievers, but little overall change since 2001 (with performance level around the PIRLS scale average, but much below Sweden and Denmark). However, these results should be interpreted with the caveat that, when the PIRLS test is administered, Norwegian pupils are one year younger than Swedish and Danish peers. Correcting for the age–difference would thus significantly reduce the observed performance gap between Norwegian pupils and the two other Nordic countries.[4]

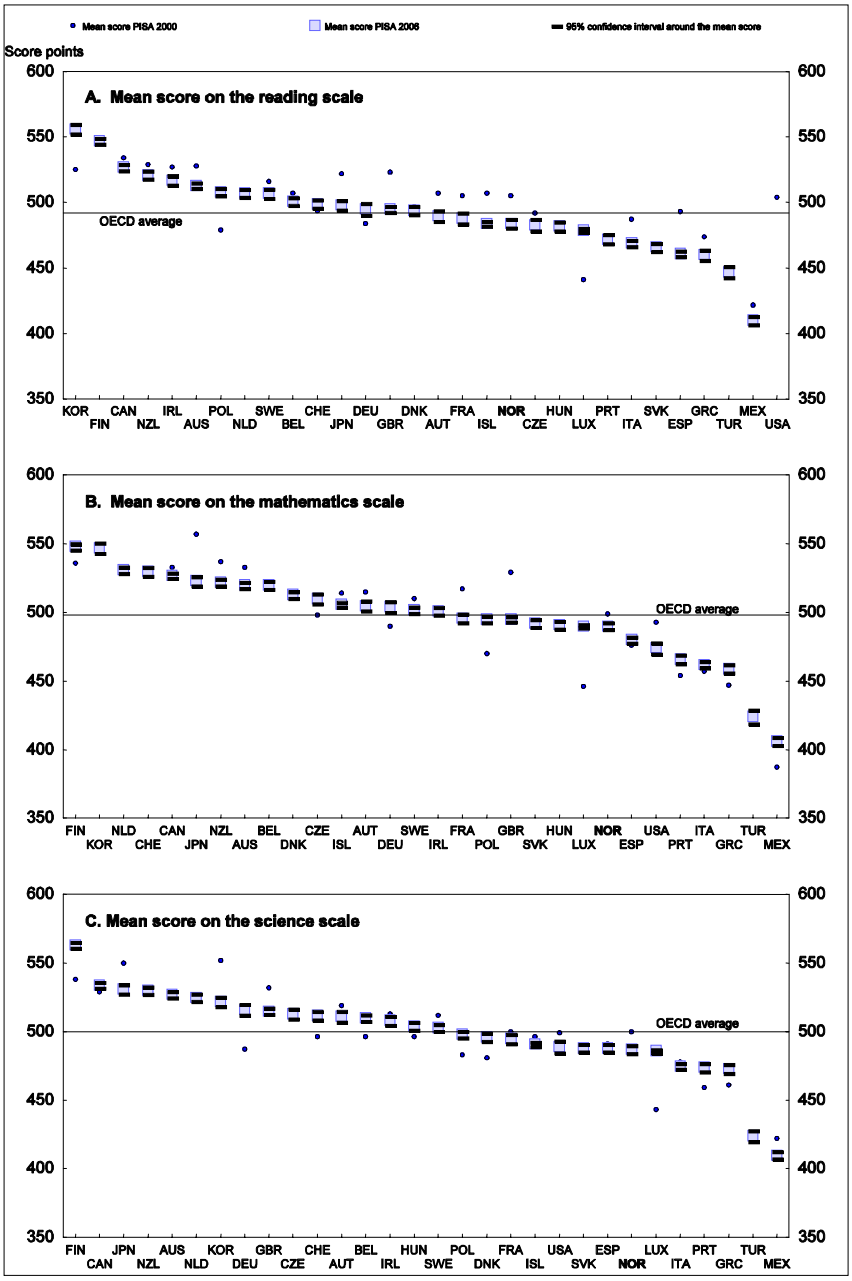
10. Despite indicators of low educational achievement among children in reading, mathematics and science, both IALS 1998 (International Adult Literacy Survey) and ALL 2005 (Adult Literacy Learning) indicate very high levels of ability among Norwegian adults. In IALS 1998, for instance, Norway was among only six countries where less than 15% of the population were at the lowest proficiency level. In ALL 2005, Norway was the best performer.

11. Two possible explanations have been put forward to explain the apparent inconsistency between children's and adults' abilities.[5] One is that there has been a deterioration in the quality of education, so that the relative performance of adults will soon begin to decline. The alternative explanation is that the comprehensive and inclusive nature of Norwegian education may give poor results on certain comparisons early on, but that it pays off later, giving individuals motivation and self–confidence for keeping–up skills and competencies. For the moment it is difficult to weigh these alternative explanations. For example, because of their cross–sectional nature, international assessment surveys cannot distinguish the effect of being educated in a particular period (the "cohort" effect) from an effect due purely to age. The only empirical study on the quality of Norwegian education over time does not find any evidence of a significant deterioration (Hægeland *et al.*, 1999). The second, more optimistic view has some support, such as the significant participation of adults in training and life–long learning (see AES, 2007). But, without more conclusive evidence on this (that might be gained through the new OECD adult skills survey planned to be come out in 2013), it would be a mistake to conclude that poor PISA performance can be ignored. Delaying effective investment in human capital is not without cost. Insufficient competence at entry to higher education might be one of the reasons behind long duration of tertiary studies.[6] Thus, deficient compulsory education may lead to both increased direct and opportunity cost of education.

Slowing tertiary graduation rates, declining interest in maths, science and technology

12. Whether or not weaknesses in compulsory education are a cause, investment in tertiary education has been accumulating at a slower pace than the OECD average in the last few years, with the overall tertiary graduation rate falling increasingly behind other countries (Figure 3). The number of graduates from theoretical programmes has been rising by 4% yearly, but this is 2 percentage points lower than the OECD average and lower than other Nordic countries. Though there has been a move towards theory–oriented tertiary programmes away from vocational programmes, as well as an increase in the effective length of tertiary studies, Norway is one of the few OECD countries where the number of engineering

Figure 2. Comparative PISA scores

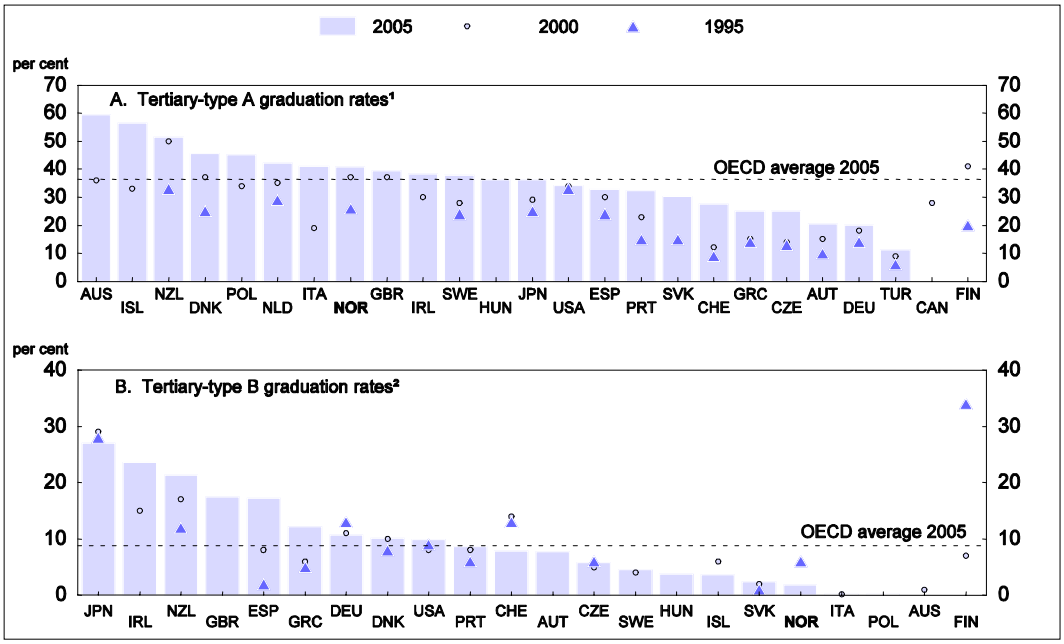


Sources: OECD PISA database 2000, 2006.

graduates is decreasing (Figure.4). It is also among the countries with the lowest increase in science graduates and the lowest number of tertiary science graduates in the population (1% *versus* 1.7% in the OECD area and 1.9% in the other Nordic countries). From a labour market perspective, this trend might not be particularly worrying if there were no visible signs of a corresponding skills shortage. While there is evidence that unfilled vacancies are currently higher for engineers (OECD 2008), it is harder to assess whether these shortages are structural. As argued below, however, the very compressed wage structure in Norway transmits inefficient signals as to what the economy needs. So, even though at the moment wage differences between new graduates from different fields of education are relatively small (Table 1), there might well be a long–term lack of qualified labour in scientific and technological fields. Finally, graduates in maths, science and technology (MST) are considered to be extremely important for driving innovation and growth, it must not be forgotten that Norway attaches a considerable importance to innovation policies and practices. The alternative would be to import qualified labour force (in scientific subjects) from emerging economies, but the fact that the current quota is far from being filled suggests that, unless specific migration policies are put in place to attract skilled workers, it would be hard for Norway to cover the gaps that the current education system is producing.

Figure 3. Graduation rates in higher education.

Percentage of students that complete tertiary–type A and B programmes for the first time,

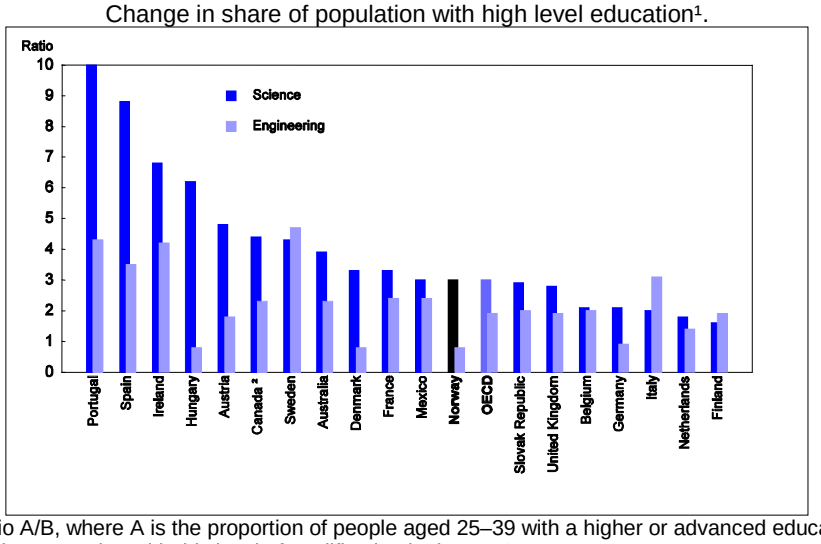


1. Graduation rates of tertiary–A programmes are calculated by summing the graduation rates by single year of age in 2005 for Australia, Austria, Denmark, Finland, Germany, Iceland, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Sweden and Switzerland.
2. Graduation rates of tertiary–B programmes are calculated by summing the graduation rates by single year of age in 2005 for Denmark, Finland, Iceland, New Zealand, Norway, Portugal, Slovak Republic and Sweden.

Source: OECD Education at a Glance 2007.

Figure 4. Generational differences in science and engineering, 2004.

Change in share of population with high level education[1].



1. Data show the ratio A/B, where A is the proportion of people aged 25–39 with a higher or advanced education diploma (ISCED 5A or 6) and B is the proportion with this level of qualification in the 55–64 age group.
2. Year of reference 2001.

Source: OECD Education at a glance 2007. Table A1.5.

13. The low number of sciences and engineering graduates may reflect the relatively low importance given to mathematics and sciences in the curriculum. In the PISA sample, only 30% of 15–year–old pupils report having regular lessons in mathematics for more than 4 hours a week (and 7% for sciences), compared with 51% in the OECD area (and 35% for sciences); this is so even though, according to PISA's pupil questionnaire, Norwegian students seem to be relatively interested in mathematics and sciences, at any rate as much as in other countries.

14. Aware of these weaknesses, the last two governments have put in place some initiatives to promote the development of MST in Norwegian education. These strategies aim to reinforce MST at all educational levels and over the working life and to improve teachers' qualifications and training in MST. However, they are not strongly focused on developing an MST culture early – already in primary and lower–secondary school – and, despite some ambitious targets, it is unclear what concrete actions are effectively envisaged. In addition there is a potential lack of long–term incentives to study MST subjects at the tertiary level, shown by low wage differentials between scientific and non–scientific professions at the beginning of careers, which tend to persist through working life (Hægeland and Møen, 2007), which would suggest that any institutional effort to develop MST culture in Norwegian education is bound to be ineffective, if the labour market does not become more competitive.

Table 1. Average gross monthly salary for full–time employed graduates by field of education, six months after graduation. Spring cohorts 1995–2005.

		1995	1997	1999	2001	2003	2005
Post-graduates, all		**100**	**109**	**118**	**132**	**137**	**144**
Humanities and aesthetics		98	104	112	122	135	137
Social Sciences		99	108	116	126	132	142
Law		97	104	117	132	133	143
Business and Admnistration		109	117	132	163	153	141
Nat.sciences, craft and technical subjects		101	111	120	136	136	145
	Physics and chemistry	**104**	**110**	**118**	**128**	**137**	**142**
	Mathematics and statistics	**102**	**113**	**119**	**137**	**129**	**151**
	Computer Sciences	**107**	**119**	**134**	**157**	**143**	**148**
Health, Welfare, Sports		103	118	129	142	151	155
Primary Industry Studies		95	100	109	118	125	127
Engineering (bachelors)		**88**	**101**	**111**			**137**

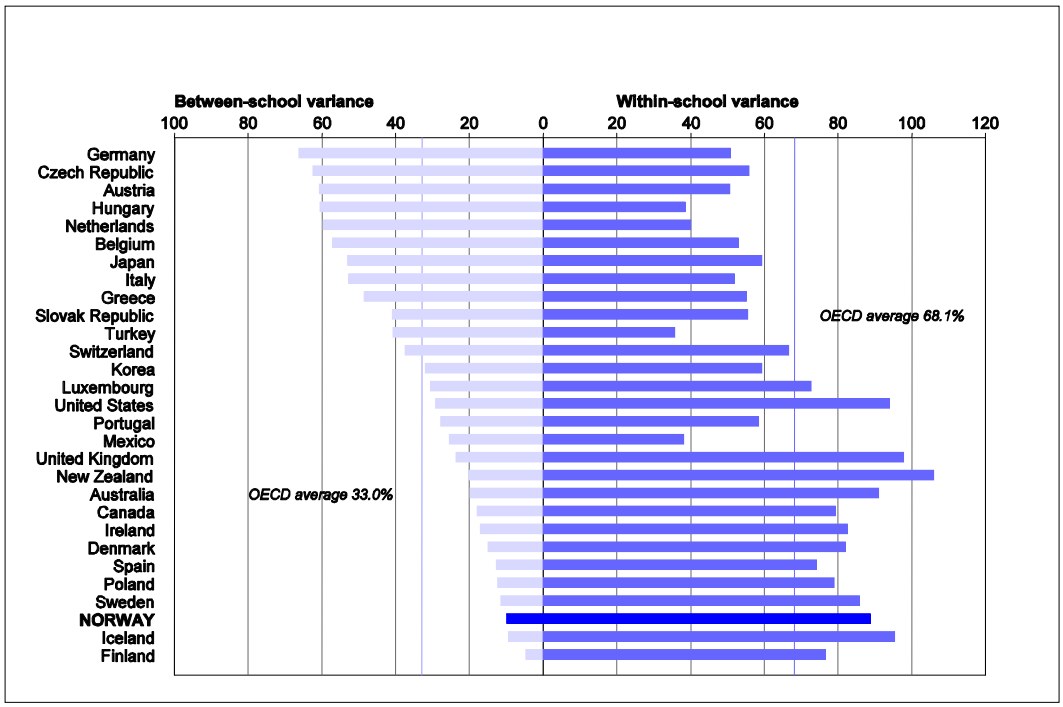
Note: Salaries are nominalised to the level of "post–graduates–all categories" in 1995 which is set equal to 100.
Source: Graduate Survey, NIFU–STEP, various years.

Equity and social goals

15. Average attainment is not the only standard by which to judge educational systems. Norwegian legislation on primary and lower secondary education arguably attaches more importance to broad notions of equity than to attainment as measured by studies such as PISA (see also OECD, 2004). On a number of indicators, at all levels, the system is relatively successful in fulfilling goals of inclusion and equity. For instance, nearly 86% of 18 years–old were in upper secondary education in 2005; this participation rate has been falling, but is still above the Euro area average of 80%. The proportion of early leavers in the 18–24 age group (many of whom nevertheless complete upper secondary education at some time) has been falling.[7] International surveys confirm that Norwegian schools are quite successful in creating a safe and inclusive social environment at school. Levels of bullying are low, and pupils generally enjoy going to school.

16. Another aspect of equity shows in comparing PISA results across schools. The variation in average performance between schools is almost the smallest of all OECD countries, *i.e*. there is, compared with the situation in other countries, relatively little advantage in going to one school rather than another (Figure 5). Furthermore, the system manages to offset the inevitable influence of family background on educational outcomes more than many other countries (Figure 6).[8] The capacity to integrate non–native children is another indicator where Norway performs well (see OECD, 2006, and OECD, 2007). Strong participation in lifelong learning at various ages may combine with the emphasis on equity in education to contribute to high social mobility in Norway (Figure 7). It is reasonable to believe that success in equity and social goals requires a lot of resources, which may explain some of the apparent inefficiencies as measured by average attainment in core subjects.

Figure 5. Low between–school variance, high within–school variance



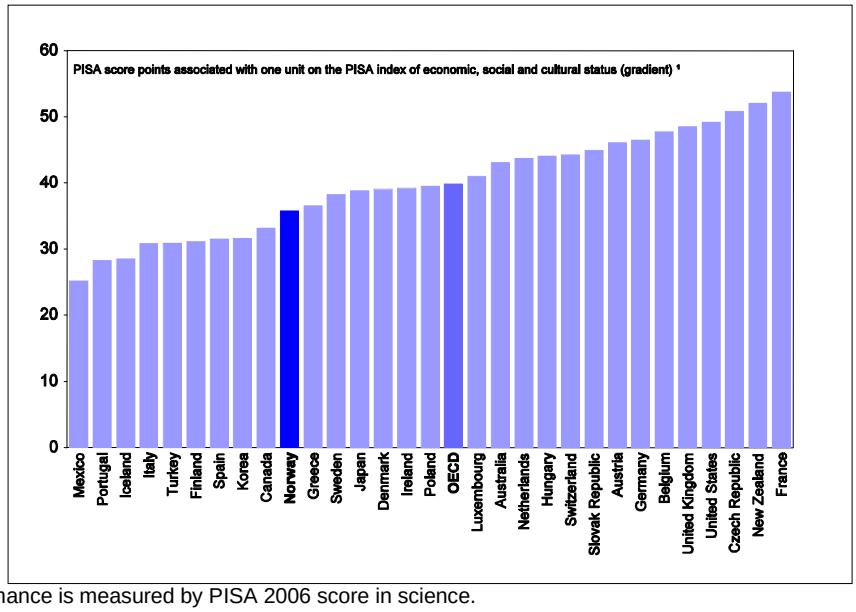
1. The between–school variance measures PISA scores dispersion between–school within a single country. The within–school variance measures PISA scores dispersion within a representative school in a given country.

Source: OECD PISA 2006 database.

How efficient are Norwegian schools and teachers?

17. The disappointing level of average educational outcomes in reading, mathematics and science in compulsory education in Norway is surprising in the light of the high level of expenditure devoted to the sector – though quite how to measure this is not always obvious. As a proportion of GDP, expenditure on primary and secondary education is perhaps one tenth higher than in the OECD average. If this were taken as a percentage of *mainland* GDP, the gap would be much higher. A common way to make comparisons (see Sutherland *et al.*, 2007a, for some discussion of this) is to express per-student expenditure using a purchasing power parity (PPP) correction. On this basis the gap between Norway and the OECD average for all of non–tertiary education is as much as 40%, while it is 10% when compared with other Nordic countries (Figure 8). However, in the last decade, aggregate spending in education has increased much less than in other OECD countries, with an almost unchanged expenditure per pupil (OECD, 2007).

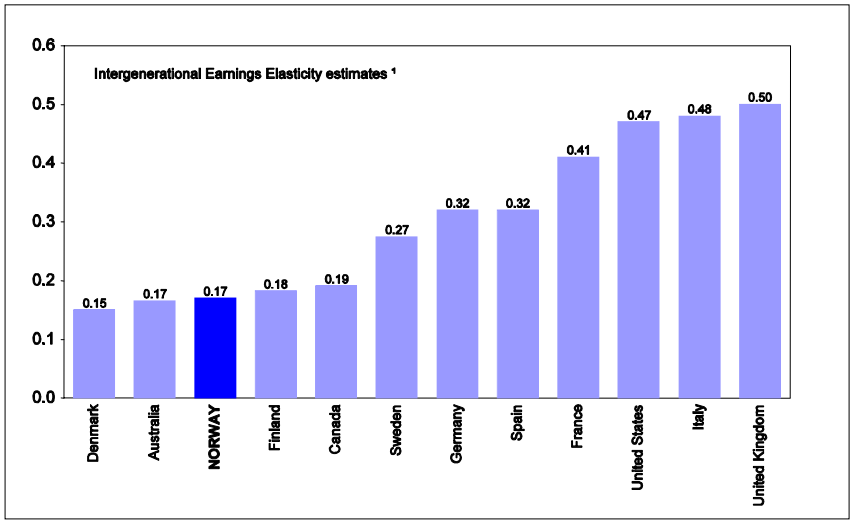
Figure 6. Below–average impact of socio–economic background on PISA scores



1. Student performance is measured by PISA 2006 score in science.

Source: OECD PISA 2006 database, see OECD (2007) for details.

Figure 7. High social mobility



1. The height of each bar represents the best point estimate of the intergenerational earnings elasticity resulting from the extensive meta–analysis carried out by Corak (2006). The higher the parameter, the higher is the persistence of earnings across generations and thus the lower is intergenerational earnings mobility.

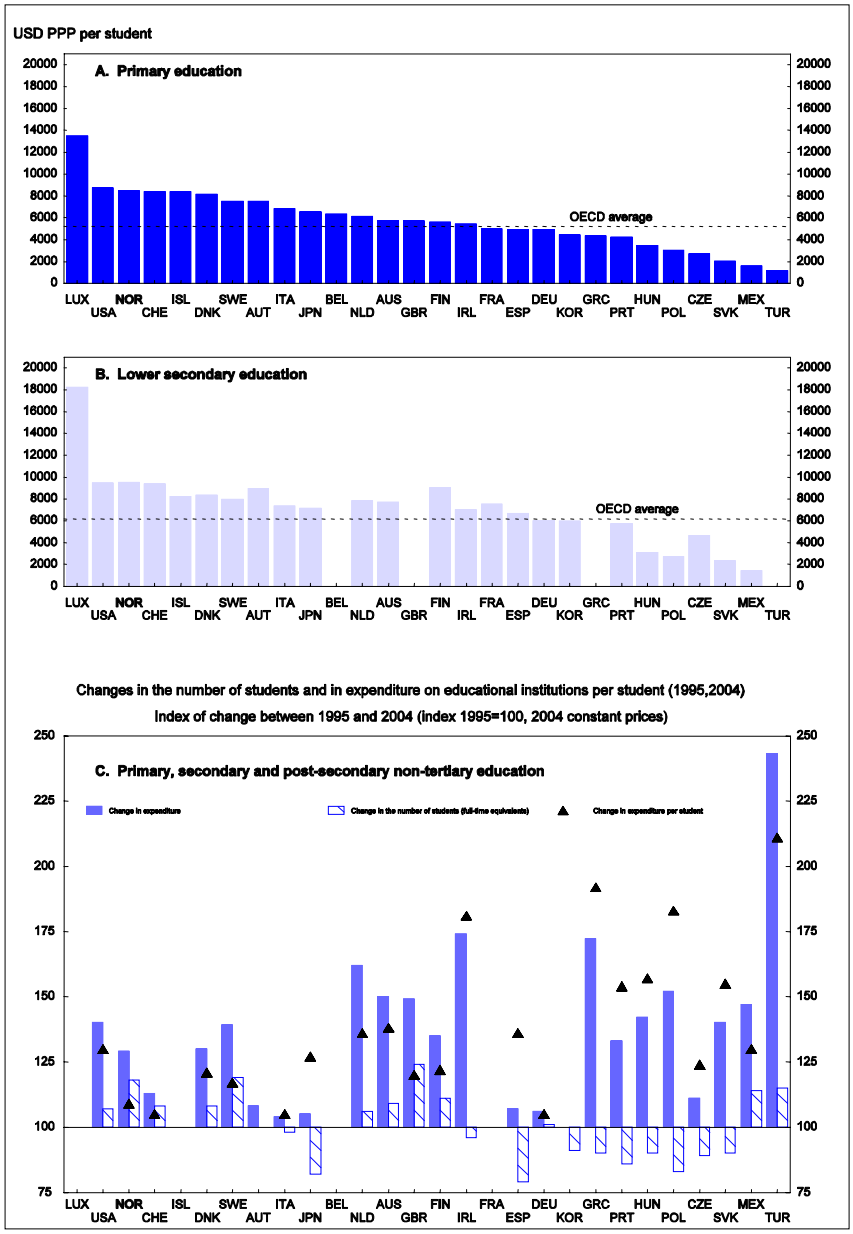
Source: Based on Corak (2006) for all countries except Italy, Spain and Australia. For these countries, estimates are as in Leigh (2006) for Australia, Hugalde (2004) for Spain and Piraino (2006) for Italy.

18. Education is a top priority on the agenda of many OECD countries spending less than Norway. High average income per capita, the central bargaining model for wages and a relatively strong teachers' union may have been important factors behind high education spending in Norway.[9] According to Falch and Rattso (1997) the very rapid increase in spending per student during the 1980s came in the wake of a substantial demographic decline in the number of students, which was not however followed by an equal reduction of teacher numbers. Spending thus remained entrenched at high levels, and teachers' unions accepted wage moderation in exchange for high employment and lower working hours. Indeed, separating

overall expenditure into its main components – teachers' average wage, the teacher per student ratio, and expenditure on items other than teachers' compensation – it can be seen that, at all education levels, the main driver of higher spending per pupil is the teacher per student ratio (Figure 9). In primary education, for instance, the teacher per student ratio is 50% above the OECD average (*i.e.* there are 12 students per teacher in Norway, compared with 18 in the OECD area) while salary costs per teacher are 20% higher. There is no difference between non–wage expenditures in Norway and the rest of the OECD area. With the exception of the upper–secondary level, differences are less pronounced between Norway and the other Nordic countries (Figure 10).

Figure 8. Expenditure per student

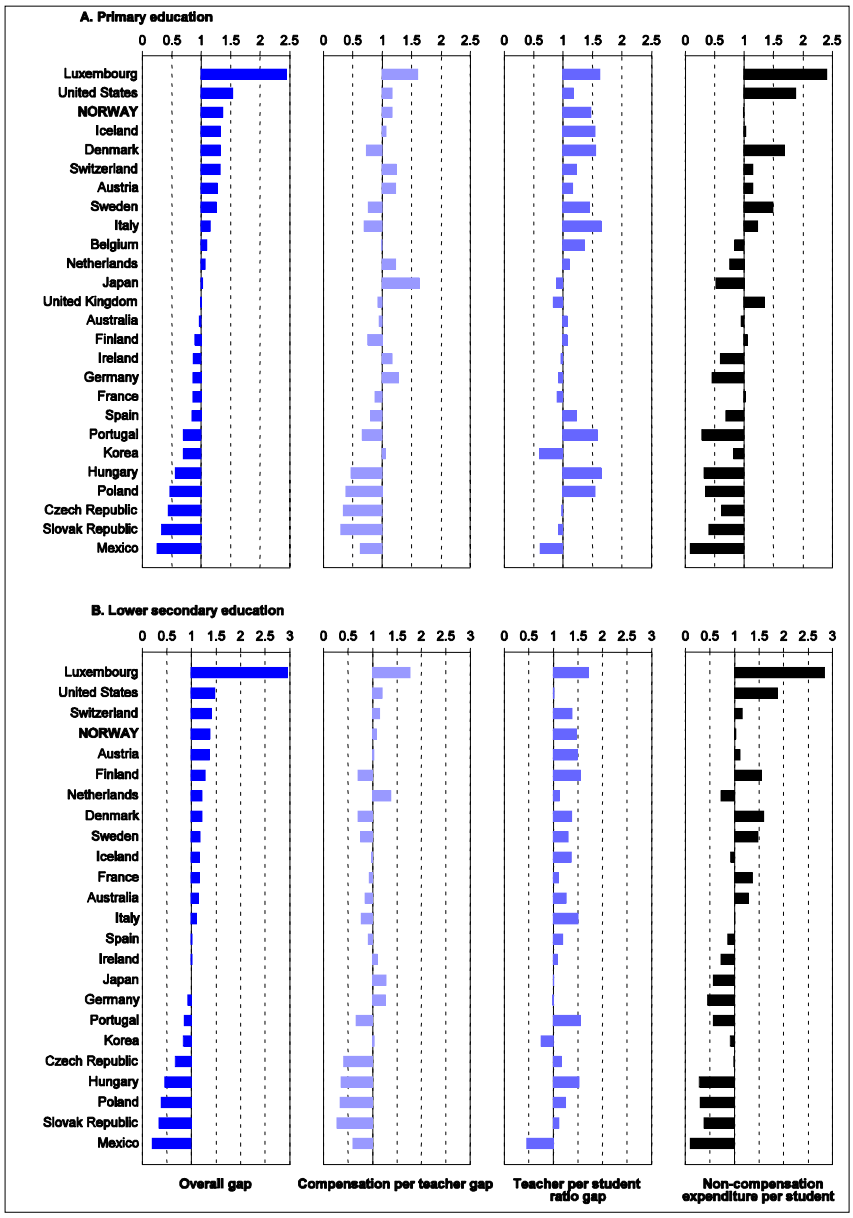
Annual expenditure on educational institutions per student for all services



1. Countries are ranked in descending order annual expenditure in primary education.

Source: OECD *Education at a Glance* database and OECD *Education at a Glance* 2007.

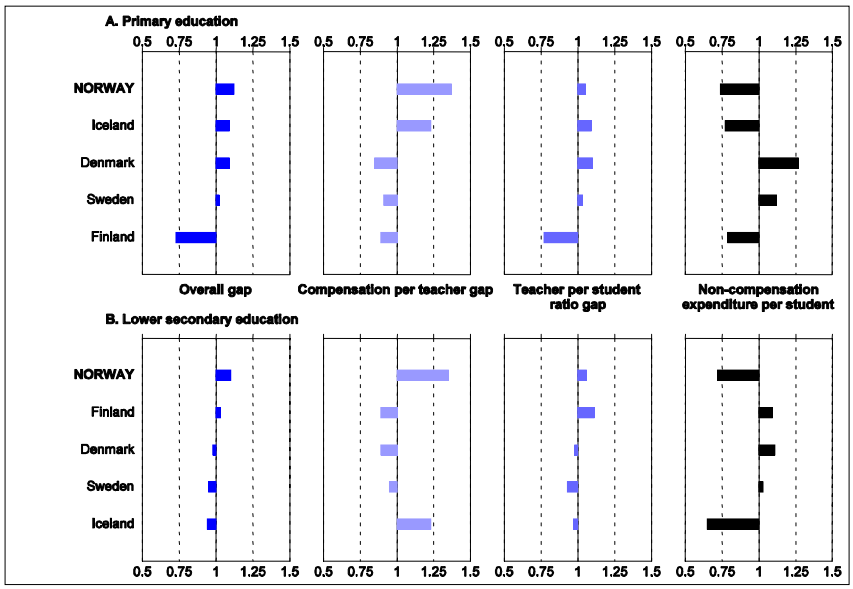
Figure 9. Decomposition of expenditure per pupil relative to OECD average, 2004



1. Canada and New Zealand are omitted from the dataset due no availability of expenditure datasets. Turkey and Greece are omitted from the dataset due to lake of data. Belgium and United Kingdom have no available expenditure data for lower secondary. For Germany, Hungary, Iceland, Japan, Netherlands and Poland, 'Compensation per teacher' covers also compensation to other educational personnel. See Annex 4.A1 for more technical details on the decomposition of expenditures per student.

Source: OECD calculations, Education database.

Figure 10. Decomposition of expenditure per pupil relative to Nordic average, 2004



1. Countries are ranked in descending order of the overall gap in respectively primary and lower secondary education.

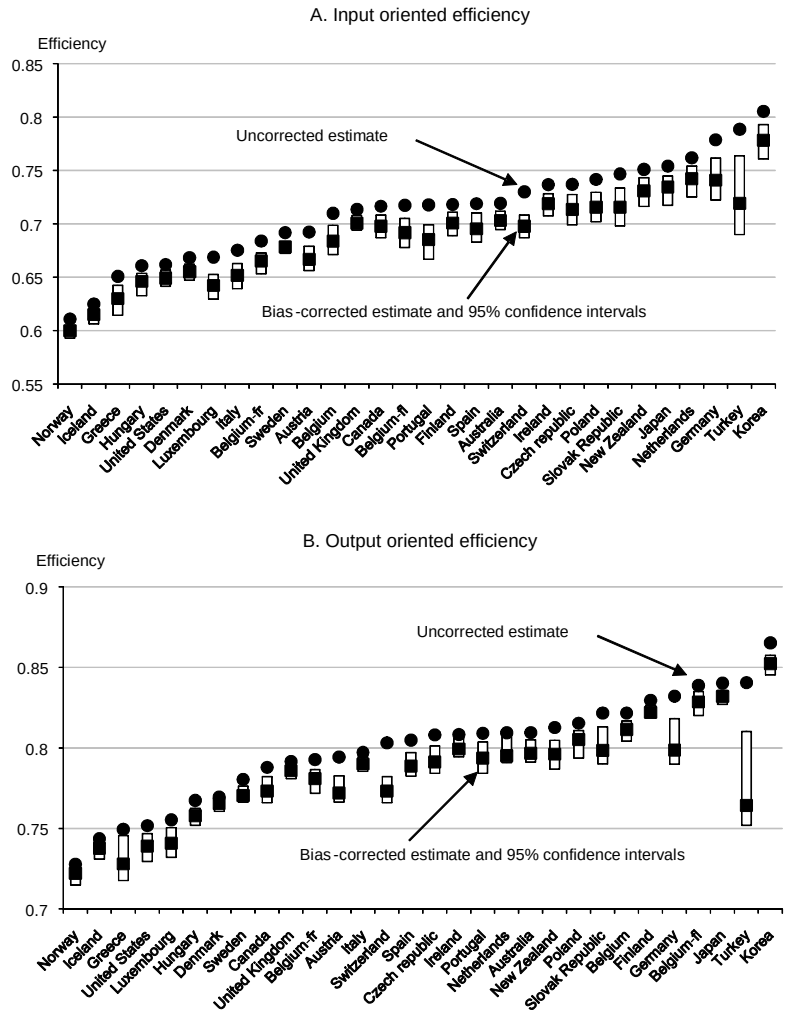
Source: OECD calculations, Education database.

Higher spending does not necessarily lead to better educational outcomes

19. It is commonly observed that there is no clear link between financial resources devoted to education and educational outcomes. Norway is thus no exception. In fact recent cross–country studies show that the Norwegian education system is one of the least efficient in the OECD area (Sutherland *et al*. 2007a; 2007b), with the median Norwegian schools appearing among the least efficient (Figure 11). This is true whether comparing Norwegian inputs with those of other countries with a similar level of performance, or comparing Norwegian performance with that of other countries using a similar level of inputs). This study also finds that even the high–performing Norwegian schools in the PISA sample perform poorly with respect to the best schools in the OECD area, which may suggest that there is a large potential for learning from the best OECD countries.

20. A national study on efficiency, looking at both municipalities and individual schools, paints a picture consistent with this story (Borge and Naper, 2006).[10] Only 14 out of the 426 municipalities examined appear efficient according to this study; the average municipality could raise its efficiency by around 14% if it did as well as the best performers, with one quarter of them 30% less efficient than the best. This study also shows that efficiency varies significantly across municipalities and that efficient municipalities attain their good performance by using fewer inputs, rather than by obtaining better school results. This holds irrespectively of the number of students in the municipality. These results confirm the observation that between–school differences in educational performance are low, but it also suggests that there are schools which use fewer resources and yet get good educational outcomes.

Figure 11. Input and output efficiency of median schools[1] in OECD countries



1. Efficiency estimates are obtained though a DEA (Data Envelopment Analysis) performed with 4 inputs (teaching and computing resources, socio–economic status of students and language background) and one output (average PISA score).

Source: Sutherland *et al*. (2007)

21. In practice, it is quite difficult to look at aggregate data to analyse policy setting, including different kinds of expenditure, to see how they affect educational outcomes. While there is an obvious trade–off on the budgetary side between the number of teachers employed and their average salary, what are their respective impacts on outcomes? There is no consensus view on the precise nature of such a trade–off, but there is evidence that student learning is likely to benefit more by increasing average teacher salaries than by using extra resources to increase the teacher per student ratio.[11] Sutherland *et al.* (2007b) also found average teacher salaries to be positively correlated with indicators of efficiency, while teacher–per–student ratios are not. However, other studies suggest that teacher–per–student ration matter at the lowest grades and particularly so for students from disadvantaged backgrounds (Gustafsson 2003).

22. Some further evidence of compositional effects of spending on educational output is also provided by cross–country regressions using PISA 2006 data. Controlling for a wide range of determinants of pupils' performance at individual and school level, regressions show that at age 15 lower student–per–

teacher ratio is not associated with higher performance of pupils (see Boarini and Lüdemann, 2009). This finding is robust across various models estimated. On the other hand, pupils' achievements appear to be more sensitive to teachers' wages, though the elasticity is small and varies with the measure used for teachers' wages. Higher wages may increase teaching quality in two ways: first they may attract prospective students into the profession; secondly they can motivate teachers to perform well throughout their career. It must be said, however, that salaries are an imperfect proxy for quality: as discussed later, substantial financial rewards are only one of many incentives that may attract good people into the teaching profession, and may be low on the list of ways to make good use of them once they are there. The following sections of this paper look at some of the influences on the efficiency with which resources are used before returning to cost–consolidation.

Teaching quality matters

23. Though this is a very complex and relatively recent field of research, there is a lot of agreement that the quality of teaching and learning matters more than everything else for pupils' achievements (Rivkin *et al.* 2000; OECD, 2006). The quality of teaching and learning is given by the interaction of three broad sets of factors:[12] teachers' competencies, teaching and learning practices and school environment. It is not easy to assess the respective importance of each of these factors, not least because most of them are imperfectly measured. Quality of teachers for instance depends on, admittedly imperfect, observables (teachers' knowledge of the subject, pedagogical competencies, teaching experience) but also on latent dimensions (communication skills, classroom skills, motivation and commitment, etc.). Teaching and learning practices also cover many things, such as instruction time, curriculum, forms of interaction between students and teachers, academic standards and assessment practices, and the institutional framework. Finally, the school environment is given by the degree of involvement of various stake–holders (parents, local government, etc.), by the average socio–economic background of pupils in a given area and by the quality of facilities.[13] Norway does relatively well in some of these areas, but there are some critical dimensions of teaching and learning that appear to be problematic.

Are teachers in primary and lower–secondary education sufficiently qualified?

24. As in many other countries, there is evidence in Norway that good teachers produce better learning outcomes (Falch and Renee Liper, 2008). Though there are some methodological caveats to the interpretation of these results,[14] this study finds that formal teachers' competencies have a positive impact on pupil's results (national tests and final exams). It is thus worrying that many teachers in Norway have no formal competence in the subject they are teaching.

25. Lagerstrom (2007) finds that less than 10% of primary and lower–secondary teachers have a thorough knowledge of mathematics (defined as at least 60 ECST credits, the equivalent of one year of higher education full–time workload), while around 40% of primary school teachers have no formal qualifications in mathematics; this share is slightly less in lower–secondary schools but still over 30% (Figure 12.). A similar picture is observed for sciences and environmental studies. The survey also shows an age–pattern with declining teachers' average competencies for the intermediate cohorts, but identifies a possible recent reversal of this trend among the youngest teachers: the overall share of teachers in compulsory education with no formal competence at all in maths and sciences has fallen dramatically due to the extension of compulsory education and the concomitant assimilation of qualification standards for primary and lower–secondary education. The number of teachers with at least 60 credit points in maths has tended to decline, especially among lower–secondary school teachers. The most recent generation of teachers (under 30), however, is more qualified than the others – an encouraging trend if confirmed; but there remains a need for policy intervention to enhance the skills of the large majority of the teaching working force (*i.e.* between 30 and 59 years old) which is low qualified, especially considering that ten years from now the most qualified age groups of teachers will retire. The situation looks better in upper–secondary education, where both average competence and the share of more highly–qualified teachers have

been rising. Criteria for qualifying for upper–secondary education are more stringent (*i.e.* teachers have to possess an in–depth formal knowledge of the subject in which they teach).

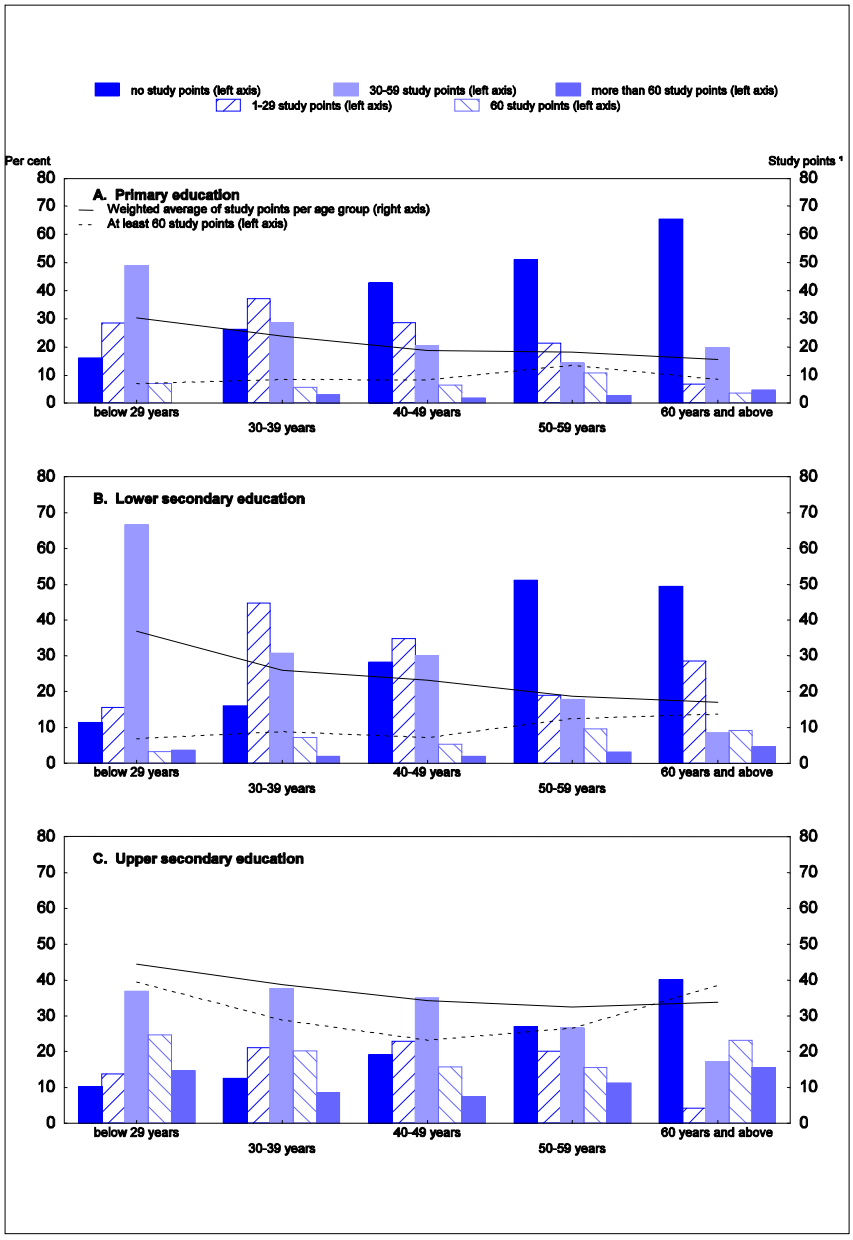
26. Part of the reason why in–depth knowledge of specific subjects is limited among teachers in primary and lower–secondary school is that the compulsory education system mainly relies on generalist teachers, *i.e.* teachers that up to now have been formally qualified to teach all subjects in grades 1–10. Notably, this means that a generalist teacher has been formally qualified to teach mathematics to 16 year olds, without necessarily having studied mathematics at all after high school. The high number of generalist teachers in Norway has certainly to do with the peculiarities of the school landscape of the country, where classes in remote areas often pool pupils of different grades. But there could also be a wrong incentive for trainees to qualify as generalists, because the Generalist Teachers Education (GTE) programme offers the highest employability across primary and lower–secondary education level. A report also found that municipalities are not eager to hire specialists in mathematics or science.[15] Specialists (*i.e.* university degree holders) might also have been attracted to other segments of the labour market, because of the stagnant earning perspectives of teachers as well as the number of hours worked (see below). There is also evidence that teacher shortages vary across regions, with the economic cycle and across subjects taught. While in the past specific benefits have been offered to attract teachers in outlying districts of the country (wage premiums, extra paid leave, reduction of student loans, moving allowances and tax reductions), the 2003 move towards decentralised wage bargaining for teachers was meant to replace those benefits. However, since decentralisation of negotiation of teaching conditions has not effectively materialised throughout the country, the mismatch of demand and supply of teachers in some regions, as well in some subjects, continues to be a problem. Though it is fiercely resisted by teachers' unions, wage differentiation across subjects taught might be the only viable solution to cope with these specific shortages.

Recruiting and training good teachers

27. To improve the average qualification level of teachers over the long term, it is necessary to strengthen the initial training of teachers. Pre–service teacher education requirements in Norway are less stringent than in other countries. While the duration and the broad features of programmes (share of theoretical versus classroom training), are fairly similar in Norway and the rest of the OECD area, there are some noticeable differences in their selectivity and competitiveness. In Norway entry requirements for teacher colleges are low and there was essentially no selection at all before 2005, when some minimum requirements were introduced. A telling comparison in this respect is between Norway and Finland (see Box 4) with the system in Finland taking thorough account of the motivation and skills of applicants to teachers' education. In Norway, not only do candidates not need to show any particular attitude or ability to teach but, with the exception of some very competitive university colleges, teacher training institutions have accepted candidates with lower grades in recent years in order to fill their vacancies, given the declining number of applicants.

28. Overall, it is necessary both to train more specialists, at least for the lower–secondary level, and to raise standards specific to each schooling level, especially for scientific subjects, in the absence of any post–graduate certification exam. The recent government initiative, entering into force in 2008, to raise qualification standards for lower secondary level certainly goes in the right direction requiring 60 credits (1 year specialisation) for new lower secondary school teachers in mathematics, Norwegian and English.

Figure 12. Mathematics knowledge of Norwegian teachers



1. Study points represent the number of time spent in studying higher education subjects, with 60–study points being equal to one full–time year of higher education.

Source: Statistics Norway, Lagerstrøms (2007).

Box 4 Teacher education in Finland and in Norway: vocation versus residual choice

In Finland the competition for becoming teachers is very severe (Kansanen, 2003), with only 15% of applicants being accepted. "Classroom teachers" (*i.e.* primary and lower–secondary education teachers teaching all subjects) study education as the major subject and begin their studies in a teacher education programme. Prospective specialist "subject teachers" attend an undergraduate course in their respective subject of specialisation and join teacher education generally after two years. The selection of classroom teachers takes place in two phases. A short–list of 3 to 4 times the number of available places is selected from among the applicants on the basis of their results on their matriculation examination (BAC) and their accumulated school marks. The second phase has three components, beginning with an examination based on textbooks. It then continues with a task whereby social interaction and communication skills are observed and a personal interview where the reasons why candidates are applying are elucidated. The selection of subject teachers is similar, with a teaching simulation task and personal interview. The status of the teaching profession is high in Finland, and shortages of applicants are recorded only in a few subjects (such as maths and physics). The high academic level of teacher education makes it possible for teacher education graduates to be employed in other sectors, if they decide not to become teachers in the end. While the programme of classroom versus teacher education is different, the academic level is the same for all teachers from elementary to upper–secondary schools.

In Norway there is little competition for entering teacher training. Today three pathways exist to qualify as a teacher of core subjects in primary or lower secondary school: *a)* General Teacher Education (GTE) training, lasting 4 years and mainly covering educational theory, three compulsory school subjects, a choice of optional school subjects and some cross–curricular topics and teaching practice; GTE requires minimum admission certification from upper–secondary school in terms of points obtained in the upper–secondary final assessment and minimum grades in Norwegian and mathematics. *b)* the Post–Graduate Certificate of Education (PCE) which can be obtained after having graduated from a theoretical or vocational higher education programme (with 1 to 2 subjects studied in–depth). *c)* from 2003 an integrated master's education lasting 5 years, covering one or two main teaching subjects. The OECD Country Background Report on Norway for "Teachers Matter" project also noted that requirements for teacher education programmes are substantially lower than for other forms of professional education.

The number of entrants to GTE in Norway is much higher than in Finland (2000 versus 800, *i.e*. 0.46 per 1000 inhabitants versus 0.15); however drop–out rate in Norway is relatively high. About 20% of education graduates in Norway work outside the education sector.

29. While measures reinforcing initial teacher training are needed, they need to be accompanied by incentives to attract prospective students. Some incentives may be envisaged to encourage entrance to teacher training (as for instance more generous financial help), but they will not probably be effective if they do not go together with higher structural incentives to take up and remain in the teaching profession.[16]

30. A substantial body of research suggests that salaries and alternative employment opportunities strongly influence the decision to become a teacher; this is true immediately after graduation as well as for decisions to return to the profession after a career interruption or to remain a teacher.[17] Norwegian studies also suggest that one of the possible reasons behind a decline in the average competences of Norwegian teachers is indeed the poor financial attractiveness of the profession. Klette and Møen (2003) show the age–profile of earnings for bachelor and master holders, working in either the private sector or as compulsory schooling teachers. Differences between earnings levels in the private sector and teachers' ones are significant at all ages, suggesting that teaching jobs pay considerably less than other sectors for a comparable level of qualification. The lifetime profile of teachers' pay is also flatter. More general evidence about the difference between returns to schooling in the private and public sector is contained in Santiago (2005): Norway is one of the European countries with the highest difference between returns in private and public sector and this difference increases with the income quintile (so it is likely to be larger for skilled workers).

31. Unfortunately there are no studies to assess whether Norwegian teachers have always been paid less than other professions, or if this trend has become stronger in the recent years.[18] There is, however, some evidence that other aspects of working conditions may have deteriorated in relative terms. In the last twenty years the downward trend in number of working hours was indeed less marked for teachers than for the public sector as whole and for the private sector. In other words, it is likely that the relatively high "leisure value" of teaching has diminished quite significantly and this may help to explain why fewer prospective students have decided to become teachers.

32. Career structure and perspectives, opportunities for professional development and their acknowledgement, merit–based incentives and the status of the profession can be as important as direct financial incentives. Norway appears badly placed under all these headings. According to OECD, (2006), career perspectives are more limited than in other countries, both in terms of financial rewards and in those of responsibility and tasks. After 15 years of experience, Norwegian teachers in compulsory school earn 20% more than at the start of their career; this is less than the half of the corresponding seniority premium in the OECD area. At the end of their careers, Norwegian teachers may at most earn 24% more than when they started, *i.e.* almost three times less than the OECD average. In addition, formal teaching tasks remain the same throughout the teachers' working life and only limited opportunities exist to move into higher responsibility activities (like coordination or coaching of young teachers; supervising teachers, etc.) apart from becoming a school principal. This is not a popular option, however, considering the imbalance between additional responsibilities and related financial reward. Professional development is possible, notably through in–service training; however formal acknowledgement is insufficient, as discussed further below.

33. Finally, strengthening teachers' professional status is an important issue which is not easily in the power of governments, but there are both direct initiatives (*e.g.* advocacy on the importance of teachers, dissemination of success stories and best practices) and indirect initiatives (*i.e.* improving incentives for excellence in the profession) which could be useful.[19]

34. Many steps to attract and retain teachers can be taken without changing salary levels. Many things need to be taken into account in thinking about the appropriate level of teachers' salaries, including the "Nordic model" which hesitates to use significant wage differentials as an economic signal. But the econometric evidence of an association between salaries and system performance, although needing to be interpreted with care, should not be ignored either. It may be necessary to improve teachers' relative earnings, provided efficiency gains can be obtained from reducing other costs, for example through higher proportion of time teachers spend in classrooms or lower teacher-student ratio.

Increasing the skills of the existing teaching work–force

35. Strengthening the initial qualification of new teachers is certainly required to raise the average competencies of the future teaching workforce. However, these policies will not produce their effects for some time, and should be supported by measures that could have some impact more quickly. In–service training for teachers is relatively developed in Norway and conditions for training are quite favourable (Table A.1, OECD 2006). Professional development may take the form of individual or group training in subjects or teaching methods, attendance at externally–arranged courses, participation in professional networks, etc. Professional development may result in explicit accreditation (increase in salary, seniority or career bonus) or not. However, the completion of professional development activities is not required for certification or promotion of teachers.

36. In–service training policies have been a crucial measure of the Knowledge Promotion reform. In the context of the Competence Development strategy, around NOK 1.4 billion were allocated in 2005–2008 to training programmes for teachers and principals. A recent report suggests that teachers feel that

their professional development opportunities have increased significantly.[20] The same report finds, however, that participation ratios have increased for informal training, but not for formal courses, which are likely to be more effective because informal training activities are neither subject to assessment/examination nor organised around national benchmarks. In fact only training leading to the award of formal qualification (but not necessarily to credits) is assessed, though this is done by examinations carried out by the institutions responsible for training, with modalities and standards open to their discretion.

37. Another limitation of current training policies is that they are not necessarily targeted on the specific lack of competencies in some disciplines: principals and municipalities, who have the main responsibility for deciding which training programme teachers should attend, seem to focus more on practical and pedagogical kind of training, rather than on courses which specifically aim at improving teachers' knowledge in taught subjects. Substantial funds have been allocated since the beginning of the reform to informal training activities, possibly inefficiently; many of these funds should be re–directed to formal types of training, concentrated on subjects (and to some less degree to methods) where pupils' needs are the highest.

Teachers' workload

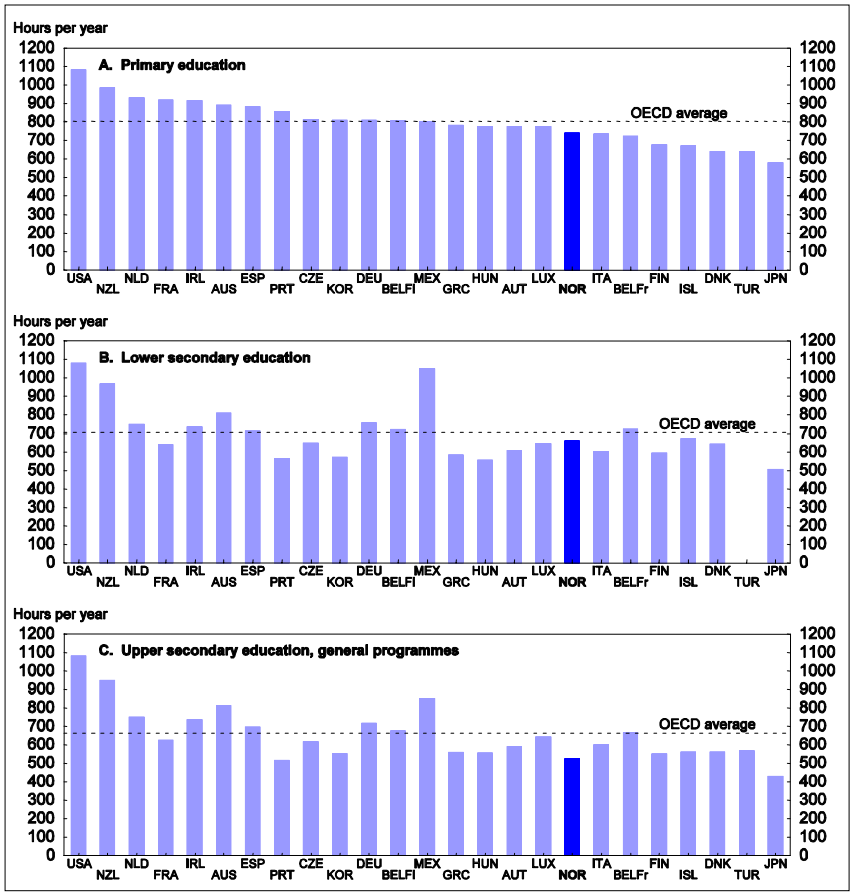
38. Despite the high teacher per student ratio, tuition time in Norway is not very high by international standards.[21] Together with those in Finland, pupils in Norway have the lowest number of total instruction hours, spending around 15% less in classrooms per year than in the rest of the OECD area. This is equivalent to more than one year when cumulated over the period of compulsory school. Many studies have shown that total learning time has a substantial impact on results, both regular teaching time (*i.e.* classroom work) and homework (*e.g.* PISA 2006, Wößmann *et al* 2007, Santiago 2002 for a review). According to PISA 2006, one additional hour of instruction time per week increases performance by 9 points, implying that if Norway were to increase tuition hours for 15–years–old pupils up to the OECD average (*i.e.* by 1.5 hours per week), it could increase its performance by 13 PISA points lifting Norway to around the OECD average; (see also Boarini and Lüdemann, 2009). A very encouraging set of initiatives has been taken by the government in recent years, leading to a progressive increase in instruction hours in lower grades of compulsory education. Moreover, as from autumn 2008, the tuition time in core subjects will be increased by 5 to 6 hours a week at primary level.

39. Norwegian teachers also have lower teaching time than the OECD average (Figure 13). The total statutory working time for primary and lower secondary teachers is 1 680 hours per year (*i.e.* practically the same as in the average OECD primary and lower–secondary schools of, respectively 1 695 and 1 687 hours); slightly more (less) than half of this is spent in direct contact with pupils through regular teaching at primary (lower–secondary) level. For this reason, the number of teaching hours per year in primary and lower–secondary education is around 10% lower than the OECD average.

40. Norwegian teachers have to be at school for preparing their lessons, carrying out other pedagogical activities and attending in–service training, for about ¾ of their total working time. The proportion of time spent in schools is thus sizeable, though it remains smaller than in other OECD countries where teachers spend the totality of their working time in schools (*e.g.* in England, Scotland and United States[22]). Increasing time spent in schools may increase the interaction with other teachers as well as with the principal. This is the reason why Norwegian municipalities are currently considering extending the time that teachers spend in schools. Considering that Norwegian pupils receive a relatively low quantity of instruction, that there are more teachers per student than in many other OECD countries but that, as argued above, a higher aggregate teacher/pupil ratio is not generally associated with better learning outcomes, it is likely that Norway is not making the best use of the teaching labour force and that a higher teaching time should be envisaged (whether in absolute terms or as a share of the total teachers working time).

Figure 13. Teachers' normal teaching time

Net teaching time in hours, 2005



1. Countries are ranked in descending order of the number of teaching hours per year in primary education.

Source: OECD Education at a Glance 2007.

Curriculum and teaching methods

41. On top of the overall quantity of tuition time, many studies have emphasized the importance of the relative time devoted to core subjects and the curricular focus on these disciplines. Norwegian 12 to 14–year old pupils spend about the same time on core subjects as the OECD average, except for science (where they spend only 2% less of their total time) (OECD, 2007). In Norway, however, a lot of emphasis is given to subjects unrelated to academic performance: pupils spend only twice as much time studying mathematics as religion, and less time in science than in physical education (and 16% of time is spent in "other subjects", including home economics). While this time allocation certainly reflects historical and cultural factors, the question of whether the timetable is still appropriate must be raised.

42. Net teaching time gives a measure of potential teachers' effort. But it is not an exhaustive measure because teaching methods may well differ in their effectiveness. Classroom practices may vary in the extent to which they make use of interaction between teachers and students, materials and resources used the nature of learning tasks and methods for assessing students' progress (Santiago, 2002). While research on the relative importance of these factors is still very much in progress, there is evidence that students whose teachers use high–order thinking type of tasks (critical thinking, applying concepts to

problems, simulations, etc) rather than low–order thinking tasks (rote learning, solving problems that are similar to others, etc.) get better results (Weenglinsky, 2000).

43. The Norwegian curriculum has been reformed quite substantially in the last decade to move exactly in that direction. Taking account of modern pedagogical theories, a major effort has been made to move the system away from traditional forms of teaching (criticised as insufficiently tailor–made and relying too much on "dominating" patterns of interaction with students) towards progressive types of classroom work. The latter mainly builds on self–regulated learning, the idea being that encouraging children to develop their own learning tools and meet their individual learning needs gives better results in the long run. So–called "Individual work plans" have been increasingly adopted by schools; they organise certain parts of students' work around two to three week periods with a relatively specific assignment and a set of learning objectives that pupils should reach at its completion. These very ambitious learning methods are intended to allow teachers to follow students with higher needs more closely and in general to give the right support to each pupil, depending on their capabilities and skills. A number of thorough classroom studies have been carried out to assess the effectiveness of work plans.[23] While methodological limitations of this kind of studies have to be borne in mind, the results are fairly clear: in practice pupils are unable to work properly within the work plan framework, they do not understand the objectives assigned and they work discontinuously on subjects. There appears to be a serious lack of communication between teachers and pupils during this classroom work and an ambiguous understanding of where the teaching and learning responsibilities lie.

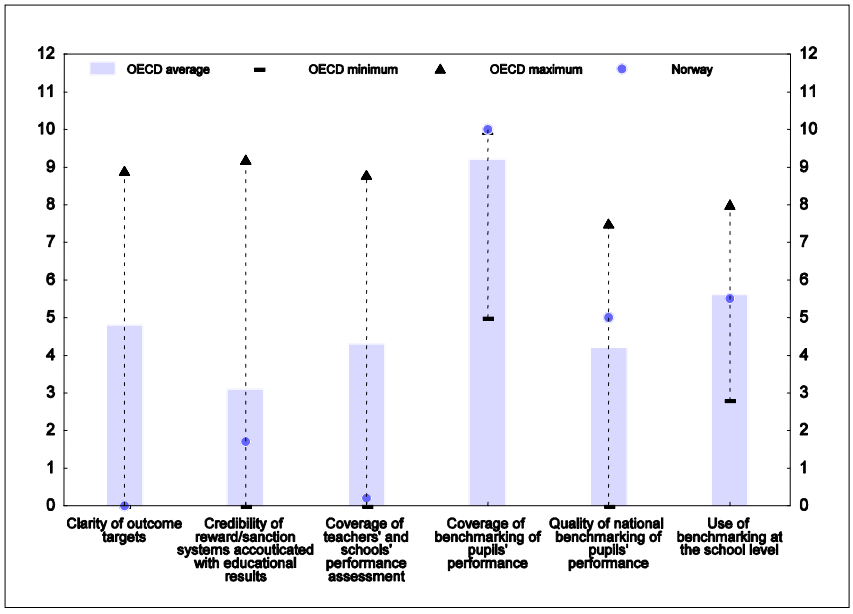
44. Work plans do not occupy all the time spent in classrooms, representing on average 40% of tuition time in mathematics, 10% in sciences and 35% in Norwegian. However they do crowd–out traditional lecture–style teaching since some parts of curriculum are not taught by teachers but are covered only through work plans. Work plans are challenging not only for pupils, from whom they require a strong dose of discipline and commitment, but for teachers themselves who need to be specially trained for this form of teaching which can involve the quite demanding job of teaching the same thing in a number of different ways. The fact that they continue to be used, in spite of reports that they may be ineffective, at least without more care being taken in their implementation, suggests that feedback from educational outcomes does not have sufficient influence on teaching practices. The central government should systematically promote and disseminate research on the effectiveness of teaching methods, such as work plans, to make sure that final education outcomes reach the standards targeted by the government.

Better schools: making information an asset and setting the right incentives

45. Beyond their level of basic training, teachers' performance crucially depends on a number of professional attitudes, efforts and skills. Many of these, such as presentation skills, organisation of classroom work, learning methods, etc. are ideally acquired during initial or in–service training and developed further with experience. However, since teachers have also to be motivated to foster these skills throughout their careers, an important question is whether the current institutional set–up of the Norwegian education system is sufficiently supportive of this motivation. Another question is whether the system helps teachers to make the best use of their competencies, for instance by giving the relevant feedback on their effectiveness in terms of actual pupils' achievements. Since the quality of teaching depends on the broader learning environment of schools, and since school leaders are responsible for teachers' performance, the general question is whether and how schools use information and incentives to reach learning goals. These questions are particularly important because of the degree of autonomy enjoyed by municipalities and schools in Norway. Autonomy can be good since it allows schools to respond to local needs and to detailed information on performance, but without the right information and incentives its benefits may be limited or non–existent (Wößmann *et al*, 2007).

46. On the presumption that incentives and feedbacks may improve teachers' and schools' performance, a number of OECD countries have recently moved in the direction of increasing accountability of teachers and schools. "Accountability" can be understood as a set of institutional rules which define objectives to achieve for various school stakeholders, with related responsibilities and arrangements attaching consequences to the measured achievements. Thus accountability comprises three different important dimensions: outcome–focused targets, benchmarking and assessment of performance with associated rewards/sanctions.[24] The principles of accountability are present in the Norwegian education framework; however, their practice seems somewhat sporadic, rather than continuous and generalised. In particular, Norway makes some use of benchmarking and has just recently proposed outcome–focused targets in a white paper to the Parliament, but makes no use at all of performance–related rewards (Gonand *et al.*, 2007 and Figure 14), though the effectiveness of the latter is somewhat controversial, as discussed below.[25]

Figure 14. Institutional accountability indicators for Norway



Source: Gonand *et al*. 2007.

47. Formal precise benchmarking was first introduced in Norway in 2005, as one of the measures meant to build up a quality assessment system. It consisted of standardised national tests carried out yearly at the end of grades 4, 7 and 10 in Norwegian, mathematics and English.[26] These tests were conducted for two years but were then suspended following strong criticism, both from researchers – based on methodological limitations – and from teachers. The government has reintroduced a streamlined, improved version of these tests in the autumn of 2007 with a long–term commitment to their use. The tests are now carried out on pupils at the beginning of grades 5 and 8; they are published by national authorities at national and municipal level, though not at school level (unless the municipality decides to do so). The results at school level are made available to municipalities for their own schools and for schools at a password–protected website. Municipalities are obliged, according to the Education Act, to follow up the results and take necessary action to cope with poor results. Within the school the test results are to be used by the principal and the teachers in their work to improve the quality of teaching. Schools are asked to inform parents about their childrens' results.

48. This represents a step forward to making information an asset for schools' and teachers' work, but there are still aspects of the benchmarking system that could be improved. First, since results are not published at school level, the emergence of best practices that may inspire other schools and provide guidance to the system as a whole, is hindered. Second, moving forward tests by a few months (from the end of the grade 4 (7) to the beginning of the grade 5 (8) implies a subtle, though extremely relevant change in the use made of these tests. The new tests are well conceived to see where the pupil stands in terms of learning, so as to provide him or her with the necessary follow–up; however, since these results are not automatically given to teachers of previous grades who were responsible for those pupils, no relationship can be established between pupils' learning outcomes and teachers' performance. The accountability value of these tests is thus reduced.

Publishing results from national test

49. Public posting of pupils' results at school level has a positive and relatively high impact on pupils' performance, as shown by regressions on PISA scores presented in Boarini and Lüdemann, 2009.[27] This is also in line with previous studies in this field. In Norway it has been argued that publication of results at school level, especially when not accompanied by proper interpretation and consideration of other important drivers of school performance such as social intake, might be distorted and lead to an "unfair ranking of schools". Certainly, non–adjusted results are misleading because they do not give information on the school's net contribution to pupils' achievements, while adjusted indicators are not easy to compute. It is also true that benchmarking should not be reduced to a simple horse race (though it could nevertheless be that competition among schools does lead to quality improvements).

50. However, benchmarking could and should be used to help schools and teachers learn from others. This requires that some guidance should be provided on how to use the results of these tests and how to share best–practices between schools and teachers. This should certainly include the development of "value added" indicators of school performance. In this respect, the OECD report Improving School Leadership (Hegtun and Ottesen, 2007) notes that schools in Norway currently see it as a problem that many resources have been used to build up a national assessment system, but a great deal less have been devoted to develop competencies in interpreting the type of information that is produced by benchmarking devices and in converting this into effective development of schools. A further effort in developing these competencies (at local or central level) is thus needed.

51. Information, properly presented, should be an asset for pupils too. Traditionally, pupils (and their families) get insufficient feedback on their attainment and difficulties. The national tests are the first initiative to facilitate systematic information flows between pupils and the school. As found in PISA 2006, Norwegian pupils stand out as having an unusually large mismatch between perceived and demonstrated capabilities – they believe that they are much more competent than their test results imply. Since their motivation is not significantly different from that of students in other OECD countries, the gap between self–assessment and performance may be indicating that learning pressure is not sufficiently high, which is line with research findings and results from surveys of pupils. This may reflect a general lack of ambition of the system (*i.e.* few incentives for students to provide adequate effort), differences between the curriculum and what is actually taught, but also a poorly designed curriculum by international standards.[28]

52. The differences between the theoretical and the actual curriculum reflect the mismatch between accountability and autonomy in the Norwegian system. Schools are responsible for implementing and partly deciding curriculum contents, but the limited accountability of both teachers and principals provides no strong mechanism to ensure full adherence to national curriculum guidelines. This is only one illustration of the potential perverse effects of an institutional set–up where autonomy is not constrained and guided by accountability (see also Wößmann *et al*. 2007; Wößmann, 2003; PISA 2006).

Accountable teachers

53. A crucial issue is how to motivate teachers to make the best use of information on their pupils' progress and how to link this information to incentives. There is a very little tradition in Norway for formal assessment of teachers (see Table 6.5, OECD, 2006 and Gonand *et al.*, 2007). Formal appraisal interviews are a right but not an obligation (they can be requested by teachers for promotion or by principals following a complaint which is very rare, however); in practice they are used by only half of principals of schools in grades 1–7, and one third in grades 8–10.[29] While these interviews provide a basis for assessing teachers' performance and agreeing on its development, these remain informal and private, with no external reviewer or standards to which the principal must adhere.[30] While in principle it is not difficult to relocate or dismiss teachers in Norway, in practice principals do not have sufficient tools (and willingness) to initiate such processes.[31] Finally, as mentioned earlier, even national tests, which in principle could provide an interesting starting point to evaluate teachers, are not effectively used to give feedback to teachers and help improving their performance. Reassuring results come, however, from the 2007 national tests, where the large majority of teachers found the tests useful to improve their own teaching and could identify the specific aspect of teaching that needed improvement.

54. Making teachers accountable requires giving them incentives to perform well. Which incentives should be given, is however a tricky question. There is indeed a quite controversial debate on the effectiveness of performance–based reward programmes. These may differ in the criteria used for teachers' evaluation and in the consequences attached to that evaluation (Box 5). The apparently poor effectiveness of these programmes is likely in many cases to be due to their poor design and implementation. Other difficulties are the multidimensional aspects of teachers' work as well as measurement difficulties in this area.[32] Although a recent study from the Australian Department of Education, Science and Training is quite optimistic about the positive impact of performance–based programmes–conditional on some key–design features, the debate is still very much divided on the desirability of these programmes, especially when they only consist of merit pay for teachers. Two more encouraging policy routes appear to be programmes targeting the group (which may be the whole school) rather than individual teachers and those relying on a mix of teachers' knowledge–skills credit system (*i.e.* relying on formal assessment of teachers' knowledge, typically completed by external review) and of pupils' achievements indicators.[33]

55. In recent years Norway has created the conditions for introducing some components of a performance–based reward system, by decentralising teachers' wage bargaining in 2003 and by devolving staffing responsibility to municipalities and schools. Thus, increases in salary related to teachers' performance are in principle possible. However, so far there has been very little use of performance–related rewards, with the exception of Oslo municipality (see Box 6). One of the interesting aspects of the experience in Oslo is the rather comprehensive definition of teachers' performance which has been used by Oslo principals who are using a performance–based system.

56. There is some preliminary evidence that policies to enhance quality of teaching and learning in Oslo have produced their expected results, as shown by results to national assessment tests adjusted for a number of other determinants of pupils' achievements. Although more research in the future is needed to corroborate these initial good results, Oslo's experience has yet to be fully evaluated, but if it turns out to be as a success story in the Norwegian context, other municipalities should find it a good source of inspiration to put in place similar policies. Overall, local negotiation of teachers' pay and working conditions should be strongly encouraged.

Box 5 Types, virtues and shortcomings of performance–based programmes

Following Harvey–Beavis (2003), performance–based programmes can be classified into three broad families: merit–pay programmes (teachers' monetary reward is based on students performance–adjusted for a number of factors); knowledge and skills–programmes (teachers' monetary reward is based on acquired qualifications and demonstrated knowledge and skills); school–based programmes, where rewards accrue to schools, which often have the power to pass them on to teachers.

Many arguments have been raised in favour of performance–based reward: *1)* a performance–based system increases motivation of teachers to perform well; *2)* a system rewarding only experience and formal qualification is unfair because it may ignore actual performance; *3)* performance–based rewards improve governance of schools (through a better resource allocation); *4)* appropriate performance–based systems can increase collegiality between teachers and administration; *5)* performance–pay systems increase political and public support for education systems; *6)* performance-based systems can be cost–neutral investment strategies to increase the quality of teaching.

Against performance–based reward it has been argued that: *1)* fair and accurate evaluation is difficult; *2)* school administration becomes hierarchical; *3)* monetary incentives are inadequate to motivate teachers; *4)* in inappropriate systems there is a risk of reduced cooperation between teachers; *5)* curriculum might become too narrow and focus only on the selected outcomes that are easier to evaluate and to reward (*e.g*. tests); *6)* performance–based programmes might be expensive.

A recent study from the Australian Department of Education, Science and Training finds that key–conditions for successful performance–based programmes are: being conceived after extensive consultation with stake–holders (teachers in particular); being context–specific; using multiple, credible and objective measures of teachers skills and student progress; establishing a clear system of significant rewards recognised as additional pay and rewarded in a timely fashion; allowing adequate time and funding for implementation; being aligned with overall school goals; being considered in conjunction with comprehensive reforms of teacher compensation and other organisational changes to improve teaching; emphasising the importance of continuous, focused learning; recognising the need to adjust the details based on early experience; exploring innovative methods of knowledge and skills assessment to reduce the workload of teachers; being supported by ongoing and comprehensive performance management and support in the local school setting.

Box 6 Oslo quality assessment policies

Oslo started quality assessment policies in 2002. These policies are carried out in the context of the Knowledge Promotion Reform and are partly funded by the Developing Competencies strategy (see Box 2). There are outcome–focused policy targets (success rates in completing both lower and upper secondary education and minimum number of drop–outs) which are set as a percentage improvement for each school. In addition, much attention is paid to pupils' results, both in the national assessment tests and in the final exams at lower–secondary education level. Oslo is also setting–up its own test for formative assessment and accountability purposes. Indeed Oslo encourages publication of results at school level, distinguishing Oslo from the large majority of other municipalities which publish results at the aggregate level (*i.e.* for all schools in their municipality). At the same time Oslo has invested a lot in the construction of value–added indicators so as to disentangle schools' contribution to pupils' learning from that of other individual and social drivers of achievements. Oslo is also developing some dedicated tools to analyse value–added indicators and use them to assess school performance (at teacher and at principal level) as well as to promote benchmarking and sharing of best–practices among schools within the municipality.

Quality assessment policies in Oslo are also increasingly making use of performance–based rewards tools which are targeted on both teachers and principals. Performance–based reward schemes for teachers consist of merit–pay only, merit being defined according to criteria which may vary from one school to another and that are usually agreed by the principal and the municipality. These criteria include pupils' results (corrected for the influence of socio–economic background), teachers' involvement in non compulsory school activities (mentoring of teachers, administrative responsibilities) and others. Performance–based reward schemes for principals also consist of merit–pay, but are based only on pupils' results (adjusted for socio–economic background).

Although robust empirical evidence on the impact of Oslo's policies is lacking at the moment, a study shows that pupils' results at the national assessment test and at final exit exam seem to be higher than in other municipalities (Haegeland *et al*., 2005).

Good principals are an asset

57. Effective principals can lead to better schools. According to the Education Act (1998) and accompanying legislation, principals in Norway are responsible for leading and developing instruction in schools. In practice principals have staffing responsibilities (sometimes shared with the municipalities), curricular responsibilities (within the framework of centrally defined guidelines) and financial ones. From the Knowledge Promotion Reform onwards, the leaders' role has indeed been increasingly identified with quality development of schools. However, it is unclear how well quality policies at school level have been successfully embedded in leaders' practical responsibilities. This is partly related to the limited use of benchmarking and of tools for directly assessing teachers' performance, as argued above.

58. Following devolution of responsibilities from the central to the local level, principals' duties expanded considerably (at least in theory).[34] Moreover, the overall burden on schools increased because of the disappearance of some support functions (*e.g.* the pedagogical guidance services) and a layer of governance at local level.[35] Although there is an increasing number of leadership agreements signed between principals and municipalities containing provisions for educational and economic management of the schools, these practices are not uniform across the country and to date there has been no assessment of how they work in practice.

59. Like teachers, principals perform better if they have the right competences. Currently, the large majority (90%) of principals hold a bachelor degree or a teacher college degree, very few of them hold a masters degree. In fact there are no formal competence requirements for principals and, apart from a recently introduced Masters studies in leadership, there are no full higher–education training programmes. This is also true in the majority of OECD countries, but Norway, unlike many countries, does not even have special induction programmes for newly–appointed principals. In the recent White Paper the government has introduced a new formal training program for newly appointed principals.

Accountability across the board

60. Effective school inspection also has a role to play. However, there is no national school inspectorate in Norway and the current legislation holds municipalities responsible for schools' results. The ministry is however responsible for supervision at national level and control of activities pursuant to the Education Act. These two responsibilities are in practice delegated to the County governors. If conditions are detected that are in violation of the Act, or regulations pursuant thereto, the County governors may order the correction of such conditions. In addition, a joint national inspection is held every year, focusing on a specific area or areas of the legislation, to ensure that local authorities' understanding of the relevant legislation and ensuing actions are as uniform as possible across the country. The results from the inspections are reported back to central government. For instance, the national inspection programme carried out in 2006, show that only a minority of assessed municipalities met the requirements indicated in the Education Act, and that municipalities' responsibility for schools assessments was exercised to a very small extent. The audit concludes that "70% of examined municipalities do not have adequate systems for ensuring that pupils' rights are secured".

61. Following the 1992 reform of local government, some municipalities adopted a three–level model and others a two–level model; the essential difference for education was that two–level municipalities devolved more responsibilities to schools and significantly reduced their own level of competence in education. According to Møller *et al.* (2006), municipalities organised as two–level models tended to focus more on the budgeting and economic management aspects, while those organised as three–level models ("sectoral forms of organisation") paid more attention to pupils' performance. An encouraging sign is that municipalities seem to be responding, and are strengthening school–related

competences at municipal level after observing that the transition from three to two levels was disadvantageous for school development and performance reporting.

62. Overall, accountability of municipalities should be further encouraged because, despite a proper regulatory framework, incentives for ensuring school performance are currently too weak. Merit pay for principals is an important policy tool that must be considered in this respect, and is less controversial than teachers' merit pay, given the importance of managerial skills for principals. As discussed in Box 6, the municipality of Oslo is rewarding principals according to their schools' performance. Although this is part of a larger set of quality policies, there was less resistance to principals' merit pay than for teachers, not least because principals are less unionised than teachers. For the same reason, other municipalities may want to consider introducing these incentives for school leaders to improve performance.

63. Despite a general orientation towards quality development and, more generally, goals of effective and equitable learning, behaviour is not converging yet to a systematic effort to improve educational outcomes, and in this respect there remain many differences across municipalities. This is changing now as there is increasing awareness of weaknesses in the education system and a strong political willingness to cope with them. But care must be taken to ensure consistency of tools and policies, in particular given the apparent contrast between the wide freedom left to local actors and the low provision of accountability devices. Given the progressive decentralisation of the management of education, the absence of a well–established framework of objectives and instruments (*e.g.* paucity of incentives for teachers and principals), may have contributed to Norway's modest performance on measures of cost–efficiency.

Could Norway spend less or differently?

64. Previous sections have discussed policies that could improve performance. Some of these have potential costs. Quality–enhancing policies which consist of enhancing teachers' wage profiles or performance–based rewards would require additional resources, unless they were implemented with offsetting reductions for less well–performing teachers at the same time. Policies that aim at changing the institutional framework, for instance by increasing benchmarking, are in principle less costly, though there may be considerable upfront costs. The increase in instruction hours could be made cost–neutral if obtained through higher teaching load, but this in turn might not be possible without financial compensation for teachers, which might be difficult if resources are constrained.

65. OECD work already discussed, however, implies that there should be a number of ways to free resources by reducing expenditures with little or no impact on performance (Sutherland *et al.*, 2007a). Norway is one of the countries which spend relatively little at central level (only a quarter of initial funds come from central government compared to one half in the average OECD country (OECD, 2007). This, together with differences in the settlement patterns and in local government preferences, results in a wide dispersion of expenditure across municipalities. Cost–consolidation policies have thus to be designed against this background.

66. According to the Ministry of Education, most variation in expenditures is due to matters beyond "direct municipal control", such as scattered settlement and the number of pupils in the catchment area. Using needs–adjusted expenditure (*i.e.* correcting for the number of), the variance between municipal needs-adjusted operating expenditure is 75% lower than the variance between the non–adjusted expenditure. The residual 25% could be due to political preferences and other structural factors. The scattered settlement and the low population density are however factors under (central government's) policy control to the extent that specific regional policies are carried out to maintain the current pattern of settlement unchanged: grants to municipalities (which are not earmarked to education in particular, but cover health and welfare expenditures too) do take into account population density and thus compensate

for the low number of public services users. In the absence of such regional policies, there would be a less scattered population so that many policies, including education, would be less expensive.

67. Some national studies show that the main underlying source of variation in expenditures across municipalities is the teacher–per–student ratio, which is itself related to school size. This is in line with an allocation model of school spending within districts estimated by Falch *et al.* (2008), which finds that the effect of school size on cost is strong, particularly so for small schools. The study estimates that merging schools could be a way to reduce overall costs. According to these estimates, merging two schools with 50 (200) students would reduce teacher hours per student by about 18% (9%) of average resource used. The study also estimates that in very small schools the cost reduction at the margin is the highest (in a school with 10 students, an additional student would imply a 13% cost reduction at the margin). Based on the same estimates, Bonesrønning *et al* (2008) found that increasing the average school size from the current value of 200 to 400 (slightly higher than in Denmark) would reduce costs by 6%. These figures provide an indirect illustration of how costly regional policies are in Norway in the field of education.

68. Other particularly significant drivers of cost are children with special needs and children with a minority background (on average 55–80% extra resources are allocated to minority students and 65–130% extra resources are allocated to students with special needs). Since these two last cost factors are not under direct policy control, reducing the number of teachers per student by merging small schools could be the only important route to cost consolidation. In fact Norway has already been moving in that direction, as shown by the declining numbers of schools in the last decade while total pupil numbers have been increasing.[36] The average size of schools has thus been increasing over the last ten years: in this period, the number of large schools has increased by 7% and small schools (with fewer than 100 pupils) have decreased accordingly. As a result of this, the number of pupils in large schools has increased, and the fewer pupils are in small and middle sized schools. Since the school year 2002–2003, more than 50% of pupils attend large schools.

69. Among the arguments raised against merging of schools there is, on the one hand, the potential impact of class size increase on pupils' achievements and, on the other, the welfare losses implied by higher commuting and possible harm to regional culture and diversity. The former should not be a reason of concern though, since many studies have shown that, for most pupils, the impact of class size on pupil attainment is relatively small.[37] Thus, changes in teacher training, incentives and accountability discussed earlier should permit improved performance even with larger class sizes. Furthermore, some long–term cost reductions should be obtained from school mergers through reduced overhead costs even if class size were unaffected. The wider welfare arguments deserve careful consideration but unfortunately sound cost–benefit analysis encompassing economic and non–economic consequences of merging schools is lacking at the moment. Again, accountability measures such as a good benchmarking system would provide valuable information for such analysis.

70. It has been argued that the debate on possible restructuring of schools has been "polluted" by political interests, not always to the benefit of citizens. According to Falch and Rattso (1999), small school size is the result of strong political lobbying at local level by representatives of municipalities. Their argument is that spending pressure decreases with municipality size, because educational services are a larger source of direct (through grants) and indirect (through income taxes) revenues for small municipalities than for larger ones, so that the former have a stronger incentive to keep small schools open.[38] Politicians may thus resist schools restructuring decisions more than citizens. Keeping schools open in very small communities that otherwise will disappear is a sensible policy only if that corresponds to informed public demand.

71. Incentives have to be given to municipalities to restrain education expenditure. Transparency in cost–effectiveness of services delivered may be a part of this incentives framework. Local property taxes might be a promising policy in this respect, as shown by a number of national studies which, both in the context of education and other services, show that school quality increases in municipalities where public

services are financed through property taxation.[39] This research supports the view that having a visible and controversial local tax related to property stimulates voter interest in local government activities and thereby may help cost control. The results from these studies have to be however interpreted with some caution, because a similar literature on other countries, notably the United States, found controversial results.

Conclusion

72. Norway needs to adopt policies that make better use of existing resources and improve their quality. The current level of spending is already relatively high and the political room for direct cost reductions may be small so that attention needs to be focused on cost–neutral measures. Resources should be redirected towards quality–enhancing inputs (as for instance teachers' training in specific skills) and away from inputs with less impact on educational attainment (non–core subjects, teacher per student ratio). Finally, policies to resist spending pressures at local level should be considered. National surveillance of municipal spending, perhaps particularly for small communities, could include actively disseminating information on those which appear to be particularly inefficient.

73. In addition to specific areas where it is clear that expenditure could be redirected, it is important to ensure that institutional reforms support a continual search for improved performance and for cost–efficiency. This means that autonomy should be accompanied by accountability, which itself depends on developing a benchmarking framework for information on performance and costs. It is clear that, given the sensitivities on performance–based rewards and possible perverse effects, this kind of policy should be adopted with care; the lessons from current experience in Oslo should be particularly useful in this respect. Box 7 presents some recommendations in more detail.

Box 7. Summary of policy recommendations on education

Increase average competencies of Norwegian teachers in primary and lower–secondary education, particularly in math, science and technology (MST). This should be achieved by making selection and graduation criteria for teachers more stringent, particularly for scientific subjects. At the same time, the number of specialists should be increased by streamlining qualification requirements for entry to teaching and making these appropriate for each level (primary, lower or upper secondary). In addition, **formal training programmes to improve competencies throughout careers should be strongly encouraged.**

Consider making the teaching profession more attractive, by improving career opportunities within the profession, with tracks associated with increased responsibilities, and by increasing professional development opportunities, with recognition of increased competencies when these lead to formal certification.

In the light of analysis of the outcomes of the use of such incentives in Oslo, **consider increasing incentives to teachers' excellence beyond initial qualification**, by considering merit–based reward schemes at school level. Promote the development of locally determined criteria for performance and merit and encourage local negotiation of teachers' pay and working conditions. **Include school performance in the criteria that determine school principals' rewards.**

Increase instruction time through higher teaching load and teaching time spent in classrooms. At the same time focus more on MST subjects from early grades of instruction, and systematically promote and disseminate research on the effectiveness of teaching methods, such as work plans, to make sure that final education outcomes reach the standards targeted by the government.

Where there is autonomy, ensure accountability. Publish results of national assessment tests at school level, complemented by value–added indicators so as to facilitate performance monitoring. Evaluate teachers' effectiveness and provide feedbacks to pupils and families. Communicate national tests results to teachers of previous grades and include their pupils' learning outcomes in assessments of teachers' performance. Continue central auditing of school performance at municipality level and consider sanctions, such as publishing information, of local authorities with poor performance and inadequate school monitoring and support mechanisms. Continue to publish information on spending per pupil and educational outcomes at municipality level, so as to enhance transparency on cost–effectiveness of education services across the country.

Envisage further reductions in the number of schools, so as to free resources that can be invested to improve teaching quality.

Notes

1. As for instance the establishment of the National Assessment System in 2004 and the Strategy for MST in 2005.

2. TIMMS (Trends in International Mathematics and Science Studies) test mathematics and sciences achievements for pupils in 4 and 8 grades. Unlike PISA which is designed to assess 15-years-old abilities to use the knowledge and skills they have acquired without a specific correspondence to the studied curriculum, TIMMS tests what students are taught and learn in school.

3. PIRLS (Progress in International Reading Literacy Study) tests reading skills among 4 grades pupils.

4. Gustavsson (2008) also shows that there is a two and half months difference between the average age of Norwegian pupils tested in 2001 and that of those tested in 2006. That difference is however not big enough to account for performance differences over time, which confirms the relative stability of PIRLS scores between the two waves of the survey.

5. Other explanations are historically high participation rates in education in Norway, and low inflow of migrants (who may contribute to low literacy among adults in other countries).

6. A simple regression of duration of tertiary studies where demand and supply factors are controlled for, shows that a low level of PISA score results in longer study duration.

7. It fell from 11% in 1999 to 7% in 2005 (compared with a drop of 2% (2.4%) points in the EU area (EU 27 countries) from 2000 to 2005.

8. This is also in line with national studies finding a moderate family's impact on pupils' achievements (Hoegeland *et al*. 2007).

9. Falch and Ratsso (1997) show that school spending growth is driven by income-elastic decisions about teacher wages and working conditions at national level. The local public sector have inelastic response to these national cost factors, and thus they are not able to hold down the spending growth.

10. The study uses grades obtained to the national assessment and exit exams results at the end of lower-secondary education, adjusted for family background. From a methodological point of view, the national study provides a more accurate estimate of the schools' contribution to the efficient use of resources (since it nets out the impact of social intake at individual and school level before the efficiency analysis). In fact Borge and Naper (2006) show that the traditional method on which cross-country studies rely (using a number of inputs including social intakes) estimates larger inefficiency scores, with almost half of the schools being considered efficient, compared to the 19 out of 426 municipalities in the baseline.

11. Teachers matter, OECD 2006. The report also observes that policies increasing wages might be more effective than those increasing teacher per student in countries facing teacher shortages, since increased demand for teachers from reducing the student-teacher ratio is likely to exacerbate supply problems. This seems to fit well with the Norwegian context.

12. Santiago 2002.

13. Factors which are not under policy influence, as the socio-economic background of pupils, will not be discussed in the rest of the paper.

14. The study uses a cross-section of data and does not control for teachers' experience.

15. Rambøll Management (2006).

16. According to Hanushek and Pace (1995), relative earnings matter for becoming teachers after relevant training has been attended, rather for enrolling in teacher education *versus* another college course.

17. See Dolton, 1990; Wolter and Denzler, 2003; Dolton *et al*. 2003; for returning to teaching profession Murnane, 1996 and Beaudin, 1993. See Santiago (2004) for a review and OECD 2005.

18. The only available piece of evidence from Hoegeland *et al.* (1999) shows that, in the 1990s, returns to education have been increasing in Norway with the only exception being the public sector employees (as a whole and without further distinction between teachers and other professional categories). Aggregate statistics, which do not control for a number of individuals' characteristics, notably education and age, point to a mixed picture. On the one hand, average relative earnings by sector show no sign of decrease between 1997 and 2006. On the other, cumulated growth in teachers' salaries between 1990 and 1999 was low (36.6% against an average of 44%).

19. A study by Treiman (1977) found that, as in many other countries, teacher professional status in Norway was well above average, as compared with other professions. More recent empirical evidence is lacking, and though there has been a decline in the number of applicants to teacher education in the last decade, this is still one of the most popular alternatives in Norwegian higher education. In 2008, 9 percent of the applicants chose teacher education (kindergarten through high school teacher) as their first choice.

20. Fafo Report, 2008 forthcoming.

21. The number of teachers per student, the average class size and the net teaching time per teacher determine the total number of instruction hours per student: $\frac{\text{Students}}{\text{Teachers}} = \text{Average Class Size} * \frac{\text{Teachers' teaching load}}{\text{Average Number of Instruction Hours}}$ with the latter term corresponding to the average number of classes per teacher. Teacher per student and average class size are not equivalent, because of variations of teaching loads, teaching assignments and class size rules. See also EAG 2007 for a discussion of actual differences between teacher per student ratios and class size in OECD countries.

22. "In England, Scotland, and the United States, the total working time for which teachers are required to be available at school is specified, although in the United States it is typically specified by state and local authorities. Total working time is defined as net teaching hours plus nonteaching time associated directly with teaching, although net teaching hours sometimes includes nonteaching time associated with other activities such as counseling students. Scotland and the United States specify the proportion between net teaching hours and those for nonteaching duties, while England specifies the total number of working hours required at school. Scotland also specifies the total statutory working hours for teachers." (Education Indicators: an International Perspective, IES, http://165.224.221.98/surveys/international/intlindicators/index.asp?IndicatorNumber=84&SectionNumber=4).

23. Bergrem (2008a, 2008b).

24. See Wößmann *et al*. 2007 and Gonand *et al.* 2007. A larger notion of accountability encompasses ethical and professionalism standards (see OECD, 2007).

25. There are some municipalities which are an exception to this (see Box 4.5on Oslo).

26. Before national standardised tests, schools were formally required to conduct school-based assessments, however in practice assessments practice differed quite a lot in terms of their regularity and quality (OECD, 2007).

27. This result is robust to possible endogeneity bias because of the methodology used in the analysis, which is cross-country (see Boarini and Lüdemann, 2009 for more details and Wößmann, 2005).

28. Though the available empirical evidence on the impact of curriculum of pupils' achievements is limited (Schimdt *et al.,* 2001), the recent new curricula designed by the Ministry of Education has not taken stock of any international benchmarking.

29. Møller *et al*. 2006.

30. Other kinds of informal practice used by principals include colleague counselling and mentor schemes.

31. Hegtun and Ottesen, 2007.

32. As argued above, pupils' achievements depend on a complex range of factors, of which only some are about teaching quality. Not always these factors can be disentangled and their relative importance appreciated. Moreover, teachers' performance can be evaluated on criteria other than pupils' performance, for instance willingness to perform administrative tasks, steering of young teachers, etc.

33. For instance the Singapore and UK programmes.

34. For instance, principals are now responsible for interpreting and implementing curricular guidelines taking into account pupils and community's context. Principals are also in principle responsible for teachers' monitoring, on top of standard staffing tasks. Budget responsibility is delegated to principals to a different extent (in municipalities where principal reports to the municipal education executive, school finances and budget balances are agreed upon by the principal and the chief municipal education officer; in municipalities where principals report to the chief municipal executive, principals are assigned a clearer responsibility because principals must find out how many employees the budget can accommodate).

35. After the Local Government Act of 1992, many municipalities shifted from a three-level governance model to a two-level one (in the three-level model principals refer to the municipal education executive, while in the two-level model they refer to the chief municipal executive). Advantages of two-level model are that municipal administration has become more streamlined in the middle, and there are more direct lines of communication and decision making between municipal top management and schools. A shortcoming is that some relevant knowledge of schools' situation has been lost in this leaning process, and that quite a lot of administrative back-up for schools was abolished.

36. From 2005 to 2007, fifty schools were closed down (forty-five primary and lower schools and five special-needs schools). About one in five closed schools underwent some organisational restructuring, merging for instance with other schools. In the same period of time, thirteen primary and lower-secondary schools were opened, six of them due to organisational restructuring.

37. Causal effects of class size on student achievement have proved very difficult to measure (see Santiago 2002 and Wößmann 2003 for two comprehensive reviews). Major early research tended to conclude that smaller classes do not necessarily lead to better educational outcomes; these have been however challenged by an increasing number of scholars. Recently, consensus has been reached on the following points: *a)* since class size reductions are beneficial in specific circumstances and broad class size reductions are expensive, class size should be targeted at those who benefit the most; *b)* the effectiveness of investment in class reduction should be compared to the effectiveness of other investments leading to higher educational outcomes (notably those on teachers' quality).

38. The strength of political coalition is also found to be inversely related to pressure spending, because political strength holds back interest groups pressure. This is line with Borge 2000 and 2005, which shows that political strength contributes to lower user charge and lower budget deficit: strong political leadership is better equipped to resist pressure from external interest groups to increase spending (in turn financed by higher user charges and/or higher budget deficit).

39. Compared to most other countries, the system of financing is quite centralised. Around 95% of local taxes are regulated income and wealth taxes where effective limits on tax rates have been in place for 25 years. The opportunity to influence current revenues is thus limited to property taxes and user charges.

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Annex

THE DECOMPOSITION OF EXPENDITURES PER STUDENT

Following Falch and Rattso (1997), expenditures per students are decomposed as follows:

$$\frac{\text{Total expenditures}}{\text{Students}} = \frac{\text{Wages expenditures}}{\text{Teachers}} * \frac{\text{Teachers}}{\text{Students}} + \frac{\text{Non - wage expenditures}}{\text{Students}}$$

Definition and sources of the main components:

Ratio of students to teaching staff: The ratio of students to teaching staff is calculated as the total number of full–time equivalent students divided by the total number of full–time equivalent educational personnel. *Source: OECD Education dataset.*

Teaching staff: Teaching staff refers to classroom teachers (ISCED 0–4) and Academic staff (ISCED 5–6). Classroom teachers include professional personnel directly involved in teaching students, including classroom teachers; special education teachers; and other teachers who work with students as a whole class in a classroom, in small groups in a resource room, or in one–to–one teaching inside or outside a 15 regular classroom. Teaching staff also includes chairpersons of departments whose duties include some amount of teaching, but it does not include non–professional personnel who support teachers in providing instruction to students, such as teachers' aides and other paraprofessional personnel. Academic staff subcategory includes personnel whose primary assignment is instruction, research or public service. This staff includes personnel who hold an academic rank with such titles as professor, associate professor, assistant professor, instructor, lecturer, or the equivalent of any of these academic ranks. The category includes personnel with other titles (*e.g.* dean, director, associate dean, assistant dean, chair or head of department), if their principal activity is instruction or research. It does not include student teachers or teaching/research assistants. Teaching staff covers only part of instructional personnel. *Source: OECD Education dataset.*

Wages: Wages means gross wages of educational personnel, before deduction of taxes, contributions for retirement or health care plans, and other contributions or premiums for social insurance or other purposes. *Source: OECD Education dataset.*

Staff compensation: Expenditure on staff compensation includes gross salaries, expenditure on retirement plus non–salary compensation (fringe benefits). *Source: OECD Education dataset*.

Educational personnel: The classification is based on primary or major functions and organises staff into four main functional categories. The classification is: *i)* Instructional personnel; *ii)* Professional support for students; *iii)* Management/Quality control/Administration; and *iv)* Maintenance and operations personnel. Teaching staff (teachers) and teachers' aides make up the category instructional personnel. For the purposes of the ratio of students to teaching staff, only teaching staff is taken into account. *Source: OECD Education dataset.*

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