Professor Hans Bonesrønning discusses his research into education economics and educational policy in Norway, expanding on topics from effects of classroom size on student performance, to the importance of financial investment on educational attainment.

What are the key issues investigated by researchers at the Department of Economics, especially those pertaining to education economics?

Much of the research into education economics has revolved around education production function, which links student performance to purchased inputs, individual and family characteristics, peer groups and other variables. The early studies used this framework to investigate productivity differences among schools. More recent work in the Department has been geared towards identifying student, teacher and parental behaviours that are associated with student performance. We have also focused on accountability systems in relation to their implementation and potential importance.

Norwegian financial investment into primary, secondary and tertiary education ranks amongst the highest within the Organisation for Economic Co-operation and Development (OECD) and Group of Twenty Finance Ministers and Central Bank Governors (G20) countries. Has this had an impact on educational attainment within Norway?

Norway combines high financial investments in education with mediocre student performance (as measured in international tests), implying that student performance per euro invested is among the poorest out of OECD countries. The drop-out rates in upper secondary school are high, and businesses express dissatisfaction with the skills of young employees. For these reasons, education towards the top of the political agenda. Politicians agree that productivity improvements are important, but at the same time, there is a growing recognition that effective reforms are difficult to implement.

Numerous education systems practice full inclusion policies, where students eligible for special education are taught alongside non-eligible students. How would you describe this practice?

It is fair to say that the ambitious full inclusion policy in the Norwegian public schools is under pressure. The proportion of students deemed eligible for special education has increased dramatically during the last decade, and the number of students provided with special education in groups segregated from ordinary students is increasing. The national education authorities have responded by insisting that the full inclusion policy should be maintained. Acknowledging the backdrop of events – which includes parents that are better informed about student performance and teachers that are held accountable for student achievement – it is hard to tell whether the authorities will succeed in bringing the schools ‘back on track’.

In 2011, you published a report based on publicly available data investigating whether Norwegian elementary students from disadvantaged backgrounds benefit from smaller class sizes. What were the results of this study?

We decided to investigate class size effects on young students from disadvantaged backgrounds because several earlier studies using data from other countries have reported positive effects of a low class size on this subgroup. Using Norwegian data, we found that young students with poorly educated parents and students from dissolved families perform better in smaller classes. In an earlier analysis, we found that 15-year-old high-achieving girls perform better in smaller classes. From these findings, we developed the hypothesis that small classes might be helpful for students who are motivated to seize the opportunity provided by a more generous teacher-student ratio, something that we’d like to investigate in the future.

Could you offer an insight into the various cohort studies you have used to support your hypotheses?

The results from class size studies are not credible unless the studies solve the problems related to two-way causality. In our studies, we have exploited the variation in class size generated by the interaction between enrollment and a maximum class size rule. With a maximum class size of 28 students, enrollment of 28 students leads to a class size of 28, while enrollment of 29 students will lead to two smaller classes, usually having 14–15 students. Our research has made use of schools with enrolments in the range of 25–34 students to investigate whether, say, students in a cohort of 30 students perform better than students in a cohort of 27 students.

Since the country has started to undergo educational reform in the 2004-06 Norwegian Parliament years, have any changes to STEM education occurred? Can you expand on this topic?

The 2004-06 reforms don’t seem to have improved the performance of 15-year-old students in mathematics and science on average. Particularly worrisome is the decrease in the proportion of top performing students. Additional means to improve STEM education (for instance, increasing the teachers’ mathematics skills) have been introduced successively, yet we don’t know the effects of these latter initiatives on student performance.
RAPID CHANGES IN the labour market mean that the consequences of leaving school early are now far greater than they were 40 years ago. Job market growth has been taking place in occupations that require post-secondary education, including STEM professions. While employment opportunities in these fields has been rising, the number of jobs in the manufacturing industry has been steadily decreasing, leading to fewer employment options for individuals who perform poorly in school or who leave it early. As such, education is important in many occidental countries, with state governments keen to invest and implement the best policies.

THE CASE OF NORWAY
Investment in education seems an obvious choice for state governments given that workers who are well educated are in general more productive, and thus their contributions spur higher state GDP and incomes. In Norway, however, significant investment in the state education system is not necessarily yielding these results. Despite the huge financial investment from the Norwegian Government, international tests show the performance of Norwegian students is poor compared to that of students from other major economies. In fact, student performance per euro invested in the education system is among the worst of the 34 countries belonging to the Organisation for Economic Cooperation and Development (OECD). Moreover, only about about 1,000 out of 100,000 employees in the age 25-34 years have STEM education in Norway, whereas the comparable number for the OECD is 1,600 individuals. The Government states that being able to increase the number of students that qualify for work in the science and technology sectors is of crucial importance for economic growth and welfare state maintenance.

Issues surrounding education economics are something that Professor Hans Bonesrønning has been grappling with during his time working at the Department of Economics at the Norwegian University of Science and Technology (NTNU). After examining the situation in Norway, he has decided to focus his research efforts on two important issues: designing educational policies to ensure the best possible results in terms of student performance and discovering the ways to properly implement these policies.

SPECIAL EDUCATION FOR NON-ELIGIBLE STUDENTS
Special education is specifically designed to improve the performance of students who, due to some type of disability, do not benefit from ordinary classroom teaching. Many education systems around the world provide special education by the implementation of full inclusion policies, by which students who are eligible for special education are educated alongside non-eligible students. However, academic literature shows inconclusive evidence for how the performance of both these student groups is affected by such an arrangement.

Norway is one of the countries where the full inclusion policy applies, but over the last decade the number of students provided with segregated special education has increased. Consequently, Bonesrønning and his colleagues Jon Marius Vaag Iversen and Ivar Pettersen, both from the Centre for Economic Research at the NTNU, have investigated...
whether the performance of non-eligible students improves when more inclusive special education is provided.

Their study, which looked at three cohorts of fifth graders in Norwegian elementary schools between 2007 and 2009, found that non-eligible students were positively affected by the number of hours of special education per eligible student. “By now it is well established that misbehaving students decrease their peers’ academic performance,” clarifies Bonesrønning who concludes that how the special education budget is allocated across the students matters a great deal to non-eligible students, as they clearly benefit from this arrangement.

Although special education resources have a positive benefit for non-eligible students, it is difficult to determine what effect this policy actually has for eligible students, as the outcomes of student performance in absence of special education are unknown. However, Bonesrønning and his colleagues assert that negative spill over effects from misbehaving students can be reduced, or eliminated altogether, if these students are offered special education.

**DISADVANTAGED STUDENTS IN EARLY GRADES**

For Bonesrønning, an important consideration to take into account when designing education policies is how to ensure achievement and better performance for students coming from disadvantaged backgrounds, such as those whose parents are educated to below upper secondary school level as well as students from dissolved families. Bonesrønning and Iversen explored whether smaller classes would help students from these backgrounds improve their educational performance. The researchers looked at the relationship between data generated from the national tests of fourth-graders in the school year 2003-04 with administrative data regarding enrolment numbers. Students, characterised by class size, were exposed to three years of treatment prior to the tests. Following this, Bonesrønning and Iversen determined that smaller classes work to reduce the socioeconomic inequalities in student performance. Although they have not investigated why this might benefit these students, the pair propose that the students might change their behaviour during their schooling career. For example, they could be more likely to seek teacher assistance in their early years, which would be easier in smaller classes. Moreover, teachers may find it easier to allocate more time to disadvantaged students.

**TEACHERS AND PUBLIC SECTOR REFORM**

Bonesrønning and his colleagues have not only been examining the best policies to achieve high student performance, they have also been working to determine the way in which such policies should be implemented for improved education attainment. To improve its standing among the OECD countries in 2004, the Norwegian Parliament began mandating an educational accountability reform. The reform decentralises important decision-making and requires that Norwegian municipalities, of which there are 430, are held accountable for student performance.

Conventional knowledge presumes that reforms aiming to improve educational productivity are often poorly implemented due to opposition from public sector employees such as teachers, who do not want to be held accountable for failure. “In political economics it is often claimed that the gainers from the status quo are politically strong and the losers are politically weak, implying that efficiency-enhancing reforms are hard to implement,” asserts Bonesrønning. Four years after the educational reform, Bonesrønning has found that teachers are in a position to hinder accountability reform, as they do not want to be subject to disciplinary action. Furthermore, many public sector employees are likely to sympathise with teachers, as they too do not want to be subjected to accountability in their own fields of work. “By regressing an indicator measuring the degrees of decentralisation of decisions and accountability of decisions, we find that less reform implementation takes places in municipalities with large proportions of public sector employees, which we interpret as being consistent with our political economy hypothesis,” Bonesrønning explains.

Another factor Bonesrønning and his colleagues are considering when investigating the poor implementation of reforms is political party involvement. For example, Socialist Party representatives within particular municipalities may find the reform unattractive for ideological reasons, and thus work to curtail them.

**POLICY RECOMMENDATIONS**

Following the analysis, Bonesrønning suggests a number of policy recommendations that could help with the implementation of the reform. For example, national governments could reduce the number of public sector employees or increase the transparency and openness surrounding the results of individual schools, which could empower parents. Introducing incentives for municipalities by making municipal revenues conditional on student performance could also help increase the implementation of the educational accountability reform.

Further to this, the Norwegian Government plans to invest money to improve the skills of existing teachers by providing continuing education. “The number one priority for the present Government is to staff the schools with more highly skilled teachers,” enthuses Bonesrønning.