The Impact of Teachers on Children with ADHD: Evidence from Danish Register Data

Franziska Valder *
EPRU & University of Copenhagen

Michaela Paffenholz †
LMU Munich & Ifo Institute

Motivation

Attention Deficit Hyperactivity Disorder (ADHD) is the most common mental disorder among children. According to the Danish ADHD Association, it affects 3-5% of children in Denmark. In 2021, around 3.1% of children aged 10-19 used ADHD medication. This is an increase of 50% during the last decade (Løvgren, 2023). ADHD is a neuro-developmental disorder that often negatively impacts executive functions, and therefore cognitive abilities and children's educational outcomes. In Denmark, around 44% of young adults with ADHD are not in education, and 25% of 15-24-year-olds with ADHD are neither working nor in education.[1] This points to clear disparities in education and early labor market outcomes that we need to understand better.

In this project, we will study the importance of teachers for the outcomes of students with ADHD. Teachers in primary school are often the first to potentially be confronted with a student's ADHD symptoms since these often occur between the ages of 6 and 12. However, teachers are typically not trained to recognize or diagnose neuro-developmental disorders, and often neither know how to teach children with ADHD. We want to study whether teachers' own knowledge of ADHD – proxied by whether they experienced ADHD in their own family – helps them to better engage with students with ADHD.

ADHD symptoms include behaviors that are considered disruptive such as inattention, difficulty concentrating, hyperactivity, and impulsivity. Additionally, children with ADHD may process information differently than children without ADHD. Studies from psychology, while few, have shown that teaching methods matter for the learning of children with ADHD (Fiore et al., 1993; Stage and Quiroz, 1997). While the economics literature has shown that teachers matter for skill development

*EPRU and University of Copenhagen, franziskavalder@econ.ku.dk
†LMU Munich and Ifo Institute, michaela.paffenholz@econ.lmu.de
[1]See Erhvervsråd (2019, 2022).

and educational success of children (see e.g. Chetty et al., 2014; Rivkin et al., 2005; Rockoff, 2004), less is known about the impact of teachers in the context of children with ADHD. Given the implications of ADHD for children's behavior and information processing, schools, and teachers in particular, can be decisive in determining children's futures. Teachers who are able to detect symptoms of ADHD and know appropriate ways to address and teach these children may be crucial for their educational outcomes and later success in the labor market. This will point to decisive factors at the early stage of the disorder's development. We believe that this is a significant knowledge gap, particularly with respect to policy implications.

Literature Contribution

The economics literature has documented substantial negative effects of ADHD for school performance and success in the labor market. Childhood ADHD is associated with grade repetition and special education placement (Currie and Stabile, 2006) as well as poor high school performance (Currie et al., 2010; Fletcher and Wolfe, 2008). The impacts of childhood ADHD persist well into adulthood and affect individuals' labor market outcomes. Children with ADHD are much more likely to rely on social assistance after the age of 18 (Currie et al., 2010; Fletcher, 2014) and have significantly lower labor market participation as well as reported earnings (Fletcher, 2014). Moreover, childhood ADHD is correlated with criminal activity in early adulthood (Fletcher and Wolfe, 2009). While we have a good understanding of the negative consequences of ADHD for education and labor market outcomes, surprisingly little is known about how to mitigate them. Another strand of literature has shown that teachers in general play an important role in shaping children's success (Araujo et al., 2016; Chetty et al., 2014; Hanushek et al., 2019; Kraft, 2019; Rivkin et al., 2005). Therefore, we hypothesize that teachers could be particularly important in the context of children with ADHD. This is supported by Jackson (2018) demonstrating that teachers play a significant role in developing students' non-cognitive skills, an aspect that might be particularly relevant for children with ADHD. While the general role of teachers and the consequences of ADHD are often studied, there is no joint consideration so far. The effect of teachers for students with ADHD is thus so far unexplored. This makes our project an important contribution to the literature frontier.

Research Questions

We want to investigate the role of teachers' knowledge of ADHD – proxied by family experience with ADHD – on outcomes for students with ADHD. We divide this question into the following sub-questions.

1. Diagnosis: As a first step, we ask, whether having a teacher with their own experience with ADHD will increase the likelihood of a diagnosis with ADHD, in particular for students who have a high probability of ADHD according to data from the well-being-survey (Trivselsmåling) of the Ministry of Children and Education. This can be interpreted as a very general first stage - testing whether teachers are indeed able to detect patterns of ADHD and subsequently, discuss them with parents.

2. School Outcomes: We then ask whether having a teacher with ADHD knowledge improves student test outcomes. We hypothesize that teachers with ADHD knowledge are better at teaching and supporting children with ADHD symptoms. Depending on the results from step one, we will test whether an effect on school outcomes is driven by access to ADHD medication or by teachers' skills.

3. Early Labor Market Outcomes: Students with ADHD struggle in the labor market. If teachers can help students by better supporting them this might also create positive spillovers for early labor market experiences. If educational outcomes improve, this will likely mechanically improve early labor market experience. In addition, we think that receiving good guidance from teachers can help alleviate general struggles and create techniques for coping with ADHD that are also useful in the labor market.

Empirical Approach

To investigate the link between teachers' knowledge – proxied by their personal experience with ADHD – and primary school children's outcomes, we will use Danish administrative data combined with rich survey data from the Ministry of Education and Children. The administrative data allows us to link information on teachers' backgrounds, their extended families, and ADHD diagnoses within the family, to the children in their classroom. For those children, we will use information on their health and healthcare use, family background, and several important outcomes, such as grades, the probability of going to a gymnasium or later to university, and early labor market outcomes. We will identify students at risk of developing ADHD using self-reported data on attention from the well-being survey (Trivselsmåling).

A crucial premise for our project is that teachers indeed have a substantial impact on the development of children. This is well established in the economics literature (see above). Nevertheless, there are several important factors to take into account in our empirical approach:

First, the effect of teachers may vary strongly according to how much time they spend with a student, i.e. how much time the teacher has to potentially recognize

patterns of ADHD. We will use information on classroom hours. We expect larger joint hours to result in a larger probability that teachers' ADHD knowledge will affect student outcomes. We can furthermore exploit planned subject hours and teachers' specialization to obtain an alternative measure of hours spent together in the classroom, using the data from the Ministry of Education and Children. We also expect the class teachers to have a particularly strong impact since they spend a lot of time with the students, cooperate with other teachers, and often facilitate the communication between school and the parents.

Second, it is likely that there are spillovers among teachers. Teachers of the same class probably exchange information about the students. This potentially pollutes our measure of exposure to a teacher's ADHD knowledge if teachers discuss students. We will investigate the role of spillovers by not only using individual experience with ADHD but also experience with ADHD in a teacher group, using only complete un-exposed teacher groups in the control group.

Third, there exist pedagogues as well as educational consultants (*Konsulenter*). They are specifically trained to support teachers and might diffuse the impact of a teacher's ADHD experience. We will test whether pedagogues or consultants play an intermediary role between teachers and students with ADHD.

Fourth, there exist special schools (specialskoler) and special classes (specialklasserækker) focusing on students with learning difficulties. These schools and classes are for children who have already shown substantial behavioral issues. Thus we will focus on a group of students that is not (yet) in special education and treat special education as a secondary outcome. We believe it is important by itself to understand who contributes with what knowledge to the sorting into special education.

Fifth, our measure of teacher experience may affect student outcomes through many different mechanisms. We will provide evidence on mechanisms by using data from the student well-being survey (*Trivselsmåling*) in which students assess teacher qualities. This enables us to understand how teachers with ADHD experience differ from teachers without.

Policy Relevance

Schools are important pillars for the development of children. Children spend the majority of their formative time at school. The school environment, particularly teachers, thus has a large impact on children's development and their success later in life. Understanding how teachers impact the life trajectories of children with mental disorders in particular is a policy-relevant question as ADHD is linked to worse life outcomes. First, the notion that all children have equal opportunities to succeed in all aspects of society and to develop skills necessary for the labor market is one of the priorities in Denmark. Schools in particular should provide equal learning

opportunities for all children, including children with ADHD. Second, improving the learning opportunities of children with ADHD most likely translates into higher labor market participation and employment. This is an urgent issue given the low participation rates of 15-24-year-olds with ADHD. We believe that our project will provide valuable policy recommendations for education policies that support and train teachers and thus strengthen the equal opportunity principle in practice. We also believe that our project and the results are relevant for policies regarding special needs education since students with severe forms of ADHD will often end up in special needs schools/classes. Special needs education has experienced a large growth in students in the last years, see Figure 1.

Project Participants

The research will be conducted in equal parts by Franziska Valder and Michaela Paffenholz, setting up a close international collaboration with research visits in Copenhagen and Munich. Franziska Valder is an applied microeconomist studying the interaction between (mental) health and labor market outcomes. She published in the Journal of Labor Economics and the Journal of Economic Behavior and Organization. Franziska Valder has experience working on Danish register data, particularly in the context of health and education outcomes. Michaela Paffenholz is an applied microeconomist working on topics in mental health and inequality. She has experience working on administrative data in a different context. The proposed project is a natural extension of the research agenda of both project participants.

Timeline and Expected Output

The output of the project is expected to be one academic paper that we aim to publish in a top general interest or top field journal in economics. The project is planned for 4 years, starting in 2025. We plan to spend Q1-Q3 of 2025 ordering and cleaning the data. Until Q1 of 2026, we want to produce the first results. We plan to have a first draft in December 2026. We aim to present the paper at international conferences and to Danish policymakers in Q1 and Q2 of 2027. We expect to submit the paper to journals in summer 2027 and finish the project in 2028.

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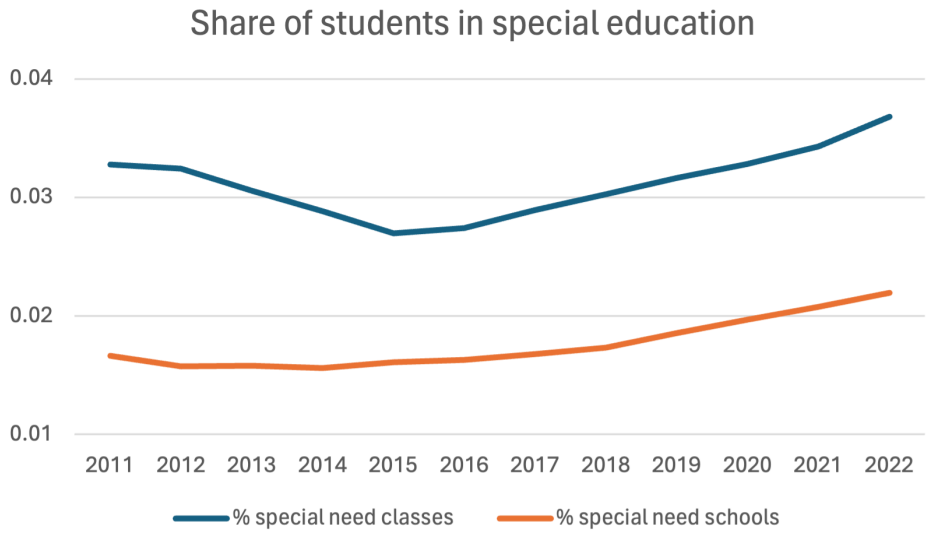
Figures

Figure 1: Growth in special needs education



Source: own configuration using data from Danmarks Statistic *Grundskoleuddannelser 2023*.