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Teacher shortages and the business cycle ☆

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ABSTRACT

The ability of the public sector to recruit skilled workers is important for the quality of public sector services. Centralized and rigid pay systems in the public sector might reduce labour supply and lead to shortages of qualified personnel in areas and periods with strong outside labour markets. This paper shows that teacher shortages measured by the share of teachers without approved education are strongly procyclical in Norway. Using a large panel of Norwegian local governments for 1981–2002 and exploiting the rigid wage system, we find a sizeable negative relationship between teacher shortages and the regional unemployment rate.

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1. Introduction

There is a growing concern that the quality of public sector services is falling because of problems in the recruitment of high-quality workers. The ability of the public sector to master future challenges in service production depends on the talent, motivation, training, and organization of the people who do the work for the governments. The importance of labour quality is emphasized for several public sector services in numerous papers.[1] Indeed, Nickell and Quintini (2002) provide evidence that the quality of public sector workers in the UK has decreased in the recent 30 years at the same time as relative wages have fallen. Corcoran et al. (2004), Lakdawalla (2006), and Bacolod (2007) present evidence from the US of both falling teacher relative wages and reduced relative ability of teachers.[2]

The present paper studies the relationship between skill composition in the public sector and the state of the labour market. Public sector labour markets are characterized by centralized decisions and strong trade unions in many developed countries (Bell et al., 2007), and centralized systems are typically regarded as rigid in the sense that wage variation across occupations and regions is very limited. The quality of public sector workers might therefore vary cyclically, and serious local labour market imbalances with excess demand in some areas and excess supply in other areas might occur as labour market opportunities outside the public sector varies.

Little systematic evidence exists on the extent of cyclical and regional imbalances in public sector labour markets. Studies mainly from the US and the UK provide evidence that outside opportunities affect supply decisions in different occupations. For example, Carrell (2007) finds that strong external local labour markets increase turnover within the United States Air Force.[3] Hall et al. (2008) find that hospital production decreases as outside labour market opportunities improves within the centralized wage system of medical staff in English acute hospitals.

The limited evidence on determinants of worker quality in the public sector compared to pure employment evidence is related to a measurement problem. How should worker quality be quantified? The ideal solution would be to measure the productivity of worker's with different observable characteristics, but this is typically very difficult due to the problems of measuring production in public institutions. An alternative to the direct approach is to study the relationship between availability of workers with certain characteristics and the conditions

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[1] See for example Borjas (2003) for the public sector in general, Temin (2002) and Hanushek (2006) for education, Krueger (1988) for federal jobs, Carrell (2007) for military services, and Hall et al. (2008) for hospitals.

[2] The hypothesis of Stoddard (2003) and Lakdawalla (2006) is that US schools over the latest decades have substituted quality by quantity, and they find that such substitution can explain the combination of rising teacher–student ratios and falling teacher relative wages. Baumol (1967) argues that technical progress in many public services, with education as a prominent example, is lower than in the rest of the economy, which increases the relative price of skills in the long run.

[3] For the effect of alternative wages for the teacher labor market, see for example Dolton and van der Klaauw (1995) and Chevalier et al. (2007). For nurses, Elliott et al. (2007) find similar effects. However, Kim (1999) finds that relative pay has little or no effect on the turnover within the State of California's Civil Service.

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in the labour market. This is the approach followed in this paper. We exploit institutional characteristics in Norwegian compulsory education to establish a rigorous measure of teacher shortages. Completely centralized wage setting and a strict national appointment rule are essential in this regard. According to the school law, schools can only employ persons without a teaching certification if no certified teachers apply to a vacant teacher position, and non-certified teachers can only be employed for up to one school year. Thus, the only possible response to shortages of certified teachers is to hire non-certified teachers on short-term contracts. Teacher shortages measured as the share of non-certified teachers thus reflect the state of the teacher labour market in a particular year and geographical area.[4] If this measure of teacher shortages increases, it reflects low interest for vacant positions, lack of options in the schools hiring processes, and thus low teacher quality.

In this paper we provide new evidence on the effect of outside labour market conditions on teacher shortages. We mainly rely on a long regional panel data set from 1981–2002 to analyze the cyclical pattern of teacher shortages, but we also provide some time-series evidence for the period 1973–2002. One problematic feature of time-series analyses is that teacher wages and teacher shortages are at least in part jointly determined. In a panel data analysis, fixed year effects account effectively for variation in teacher wages in a centralized wage setting system. Further, by including regional fixed effects we control for invariant differences in outside opportunities and general attractiveness across local labour markets. Conditional on other covariates, the temporal variation in regional unemployment can be used to estimate the business cycle impact on teacher shortages.

Some papers have analyzed similar measures of public sector work force quality. Krueger (1988) analyzes time-series data for the US federal sector and finds that the number of applicants per vacant federal job is positively related to both the relative wage and the general unemployment rate. Based on NLSY data for females, Bacolod (2007) finds that the lower teachers are paid relative to professionals, the less likely are high-quality educated women to choose a teacher career.

A related literature to the present study examines teachers' decisions on whether to leave or stay in teaching. The findings regarding the effects of relative teacher wages are mixed, see for example Hanushek et al. (2004) and Scafidi et al. (2007).[5] One particular concern with this literature is that the school district wage level may respond to teacher behaviour. Evidence from the UK suggests that the decline in relative teacher wages has reduced the share of graduates choosing to teach, see Dolton and van der Klaauw (1995) and Chevalier et al. (2007). Thus, the evidence indicates that teacher wages are more important for the decision to become a teacher than for the decision to exit teaching, and that absence of geographical pay flexibility may lead to inefficiencies in the teacher labour market. The evidence on the effects of unemployment is scarce, but Falch and Strøm (2005) find that regional unemployment decreases the probability to leave teaching, in particular for women 30–50 years of age. We deal with gender specific labour market conditions in our panel data analysis.[6]

The paper is organized as follows. Section 2 presents the institutional set-up and a simple theoretical framework to understand the working of the teacher labour market. Section 3 shows time-series evidence on the relationship between teacher shortages relative teacher wages and total unemployment. Section 4 presents panel data evidence from estimating the relationship between local teacher shortages and local unemployment. Section 5 concludes.

[4] Bonesrønning et al. (2005) use the same shortages measure to analyze the relationship between teacher sorting and student composition using school level data.

[5] Neither of these studies includes the unemployment rate as a measure of outside opportunities.

[6] Flyer and Rosen (1997) argue that the growing costs of elementary and secondary education can be related to the rising value of women's time.

2. Institutions and theoretical framework

2.1. Institutions

Similar to many other European countries, teacher pay setting in Norway is highly centralized with bargaining at the national level. In the period covered in the present paper, teacher wages and workload were completely determined in national bargains.[7] In a given year, the wage for an individual teacher was solely determined by the amount of formal education and teaching experience. The national contracts effectively prevented schools and local governments to use wage and workload policy to attract teachers.

The school law requires that only persons with a teacher certificate can be employed in permanent positions. Non-certified persons can be appointed only in cases where no certified teachers are willing to accept a vacant teacher position. According to the national contracts, representatives of the teacher union must be informed prior to every hiring decision and in this way the union is able to closely monitor that the schools and local governments operate in accordance with the rule, which have been one of the cornerstones in the teacher union policy. By this legislation, the number of non-certified teachers relative to total number of teachers is a measure of teacher shortages. Variations in this measure are indeed followed with large attention by commentators and politicians.

The degree of turnover in Norwegian schools clearly makes teacher shortages vulnerable to shocks in the private sector labour market. Falch and Strøm (2005) show that the quit rate of teachers below 60 years of age who are employed in permanent positions is about 10% in Norway in the 1990s. Separations are higher, at about 17%, because of retirement decisions and because some teachers are employed in temporary positions. The recruitment rate is slightly higher than the separation rate since teacher employment increased during the empirical period.[8] This teacher turnover rate is comparable to the US and UK.

Public primary and lower secondary education in Norway (first through tenth grade) are comprehensive in the sense that no tracking takes place. An important element in the education policy in Norway has been to integrate children with different backgrounds and ability. The school enrolment date is in the year the child turns six and is basically not subject to parental choice, and students almost never retain a grade or get promoted faster than the normal rule. Thus, a grade consists of children born in the same calendar year, and the pupils have to a large extent the same classmates during the years of compulsory schooling.[9]

Primary and lower secondary education are the responsibility of the local governments.[10] The local governments are multipurpose

[7] A very limited amount of local flexibility in wage setting was introduced in 2001, and the formal possibilities of local wage bargaining for teachers have gradually increased in recent years. Thus, in the empirical analysis we restrict the attention to the years up to the school year 2002–03.

[8] A more detailed investigation of the separations following the specific school year 1998–99 shows that there were 10.5% separations for non-teaching alternatives and 8.4% separations for another teaching job. Consider those who left for the non-teaching alternatives. Around half of them held a permanent teacher position, while the other half was appointed temporarily. 13.3% were above 60 years of age and likely to represent retirements. Another 13.4% returned to a teacher position in the same school within two years and contains to a large extent those on maternity leaves. 12.6% returned to another school within two years and represents mobility within the educational sector. Finally, 57.8% of those who left for non-teaching alternatives were below 60 years in 1998 and did not return to the educational sector within the sample period.

[9] There are typically separate primary and lower secondary schools. The lower secondary schools tend to be larger than the primary schools because they have a larger catchment area. About 15% of the schools are so-called combined schools with first to tenth grade. In the data we are not able to distinguish between school types for the first years.

[10] Private schools are mostly religious schools and do not provide an alternative to public schools. The share of students in private schools was 1.2% in the fall 1992 and 1.9 in the fall 2002.

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