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Vocational Schools and Local Industry Development

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Abstract

Title: Vocational Schools and Local Industrial Development Author: Jesper Eriksen Affiliation: Aalborg University, IKE/DRUID, Department of Business and Management. Enrollment Year: 2016 Expected Final Date: June 2020 E-mail: jeri@business.aau.dk The following abstract is a description of an intended research project. As such the abstract differs from the described requirements. Nevertheless, I hope that you may consider the acceptance of the abstract as a description of a proposed research project which may bear important contributions to the understanding of institutional and industrial developments in a Danish context. Existing knowledge: An important aspect of sustaining and developing industries is for firms to have access to appropriately skilled labor and their knowledge. When the mobility of the labor force is constrained, the geographical distribution of the labor force becomes of importance for the industries. The proximity of education institutions can be a constraining factor with respect to this distribution, and former research has well established how the development of new education institutions affect among other things new firm entry. Less has been done with respect to understanding the effect of closing education institutions, and especially so in a Danish context. Research gap: The proposal is to investigate how geographically contained groups within industries react to increases in distance to education institutions following institution closings. The reaction is to be measured in general firm performance, size of the group, and labor wages with an emphasis on the Danish case. The Danish case is especially characterized by a fully public education system, as well as a small geographical reach. Theoretical argument: The performance of firms and development of industries depends on the existence of relevantly skilled labor, which in turn depends on the distribution of education institutions. If the constraints on labor mobility are strong enough then companies within industries in geographically contained groups near closing institutions may be forced to search for workers elsewhere at higher wages, experience worse performance due to the use of less appropriately skilled workers, or in turn diminish the size of the group over time. Method: To investigate the research question I propose to utilize a difference in differences approach on Danish company and worker data. Specifically, I propose to investigate 'treatment' groups of companies near 4 vocational education institutions which closed in between 1990-1995. These companies must be confined to industries that have specific labor requirements associated with the educations at the institutions. The control group would be groups of companies in the same industries near institutions that does not close. The groups of companies must stem from otherwise similar settings. To investigate differences in development before and after the closing of an institution I will be using Danish register data to evaluate the size of the groups, firm performance, as well as workers' wage levels in the companies. Baptista, Rui; Lima, Francisco and Mendonca,

Joana (2011), "Establishment of Higher Education Institutions and New Firm Entry", *Research Policy*, 30, pp. 751-760.

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Vocational Schools and Local Industrial Development

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Abstract

The following paper describes a research proposal to investigate the effects of closing vocational schools on nearby business environments in Denmark. Throughout the period 1985-1995 7 technical schools, providing vocational education, were closed in Denmark, reducing the total number from 59 to 52. Existing research has shown positive effects on region-wide productivity and firm start-up numbers of both the existence and creation of universities. The effects are often described as agglomeration effects. Little is known about the effects of vocational schools on nearby firms, employees and industries' development as well as start-up rates of firms. This paper proposes a research design to investigate these effects by using a differences in differences on firm performance data in regions with closed and non-closed vocational schools.

1 Introduction

Several studies have investigated the effects of education institutions on nearby industrial development, noticing the possible agglomeration economics. However, the studies tend to focus primarily on the effect of universities, leaving out other types of education institutions. The starting point of analysis is the possible agglomeration economics that universities can create. Agglomeration effects was originally theoretically developed by Marshall (1920), but has in recent time seen further development. Armington and Acs (2002) sum up these effects as demand effects from concentration as emphasized by Krugman (1991) in combination with transportation costs, entrepreneurial cultures, and regional spillovers from labor market characteristics.

In the university centered literature the spillovers seems to attract the most attention. It is particularly emphasized by Audretsch et al. (2007) who describes how knowledge spillovers from universities to companies may happen through firms collaborating with universities or firms hiring graduates from the universities. Hired graduates may promote relationships with the universities also. The firms in contact with these knowledge spillovers will in turn have a higher potential to innovate and may experience higher overall productivity. New firm births based on the university and firm developed knowledge are also apparent byproducts of the existence of universities. As examples, Andersson et al. (2004) find positive productivity effects in swedish regions that experience the establishment of universities and Baptista et al. (2011) find higher firm birth rates for high technology companies (and lower for low technology manufacturing firms) in Portugal. Drejer et al. (2014) show that Aalborg University has an integrated role in regional and national development in several areas which include knowledge development and dissemination, and demand effects from physical capital development.

The three research articles above are few among the many. This is not similarly the case for investigations of vocational schools and their effect on the local economy. Often portrayed with respect to vocational schools is the return to vocational education (see e.g. Meer 2007 and Neuman and Ziderman 2003) or the *clean slate effects* of the vocational school programs (Kelly and Price, 2009). Nevertheless the rise in need for skilled educated people on different parts of the world¹ the relevance of investigating the effects of the institutions that help

¹(Newman and Winston, 2016) investigates the american economy in which skilled workers seems be in

provide that labor.

2 Vocational Schools and Local Business Environment

The danish vocational schools are characterized by a high degree of specialization and cooperation with industry. The typical vocational education provide an alternative to high school for danish students with a length of 4.5 year. The first year consists of a one-year basis-course followed by a 3.5 year main-course in which the student alternates between apprenticeship at firms and schooling(The Danish Ministry of Education, 2011). This structure is similar to the dual system in German vocational education (Newman and Winston, 2016, pp. 130-135). In both countries workers are characterized by a relatively high skill level to countries such as the United States. The structure of the vocational education system fosters strong connections between the vocational schools and industry. This is further emphasized by allowance of industry participants into negotiations on the development of vocational education. All of these characteristics foster a knowledge diffusion from the vocational schools to and among firms. This may show up as increased performance and innovation among the firms primarily utilizing skilled labor that are located near the vocational schools. The effects are, presumably, smaller than for universities as the vocational schools do no engage in research activities. Other agglomeration effects may also pertain to these institutions.

A vocational school may provide the nearby area with a relatively thick labor market with high skill levels that can allow for firms to gain relative cost advantages. The existence of localized firms and the education institution may also create positive demand effects and possibly feedback loops. The vocational school can create demand effects as an entity, but also through the employed staff and students at the school. Should a relatively large share of graduated students choose to stay in the local area² this may also add to the demand effect. The induced local demand can assert positive gravitational effects on existing and new firms. The higher share of local firms can in turn close the circuit of feedback loops.

In summing up I have proposed the following three effects that intersects with the agglomeration effects in several disciplines as large companies are moving production back to the U.S.. Meanwhile in the danish economy a possible shortage of skilled workers seems to be on the rise (?)

²Drejer et al. (2014) show that university graduates from outside of the capital tend to migrate there following graduation due partly to smaller regional job markets. To what extend this applies to vocational school graduates in Denmark is less known.

glomeration economics described above: (1) Knowledge diffusion from schools to firms as well as possible knowledge sharing among employees, which in turn may use the knowledge to innovate, (2) a thick labor market with respect to specialized skilled labor that may promote relative cost reductions for firms (and employees), and (3) Positive demand effects from the vocational schools, locally situated graduates, supplementary which in turn may lead to the existence of more firms and possibly higher profit rates.

To what extent agglomeration actually exist around vocational schools can easily be tested by evaluating relative densities of firms near the vocational schools and comparing to regions without such schools. The relevant firms and industries would primarily be those utilizing relatively high shares of skilled labor. Inferring causal effects about the three above points pose bigger difficulties. In the next section I propose a methodology to investigate the possible effects of vocational schools on local economic environment that utilizes the closing of vocational institutions. When removing the vocational school, the above positive effects should be diminished as the distance to a vocational school increases. Naturally, there may be other confounding factors as to seeing such effects, including large cities environments, strongly and persistently institutionalized business settings and other education institutions that may minimize the possible effect of the vocational school on the local business environment. In the following section I produce a methodology that may be used to attempt to find any effect that a vocational school confers to the local business environment.

3 Methodology

The proposed research design makes use of what may be describes as natural experiments. During the period 1985-1995 7 vocational schools were closed in Denmark according to The Danish Ministry of Education (1998). Assuming that rationalizations for closing the schools were not related to the local business environments, the removal of a vocational school allows may be viewed as exogenous³. Given this exogenous 'treatment' we can attempt to investigate the effects of vocational schools by the effects a removal induces.

³Several other factors that can have been a part of the considerations of closing the schools that may be related to local firm and industry environment. These may for example include outsourcing of large nearby firms production sections and subsequent decision of removal of training schools. These will be evaluated as more knowledge about the schools have been acquired.

To investigate these possible effects I will be utilizing the danish register data on firms and employees. The effects that may be of interest may include the change in average profit rate, amount of employees, cost levels and investments for existing firms. On a larger scale, we may be interested in the amount of new started and closed firms in the local area. Given the availability of employee information we can also investigate the wage rates that the firms pay, as well as the geographical distribution of workers. Finally, we may attempt to characterize changes in industrial makeup over the investigated period. In the analysis it is naturally primarily firms and industries employing relatively high shares of skilled labor that have our interest.

To estimate the possible effects I propose to use the differences in differences estimation method (Angrist and Pischke, 2009, pp. 228-242). Each 'treated' region is matched with a control region that does not experience the loss of a vocational school. The regions are matched so as to be as similar as possible before the closing, such that we may expect trajectories in the above variables would remain similar for the two regions, had the 'treatment' not happened. Alternative estimation methods may include fixed effects estimation.

4 Conclusion

I have above outlined a possible research project that may attempt to show which, if any, effects the location of a vocational school may have for the local business environment. I propose to use the closing of 7 vocational schools in the period 1985-1995 in combination with danish register data on firms and employees. Estimation of effects on firm performance, which include profit rates, cost development, investment rates and employment, may be performed using a differences in differences approach. Effects associated with employees and industry level effects may also be included. The proposal takes a research agenda that has for long been applied to higher education institutions to the vocational schools.

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