Vocational Education and Local Industrial Development
KID Summer School 2017

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July, 2017
Agenda

1 Introduction
2 Research Question
   Vocational Education
3 Theoretical Framework
   Vocational Schooling Theory
   Hypotheses
4 Data and Methods
The PhD Project

The Economics of Education in Denmark

- The structure of the education system and economic outcomes
- Effects at *individual* and *industry* level

Topics

- Industrial effects of changes to the system (today)
- Intergenerational Mobility - Inequality
- ????
Agenda

1. Introduction

2. Research Question
   Vocational Education

3. Theoretical Framework
   Vocational Schooling Theory
   Hypotheses

4. Data and Methods
Research Question:

- What happens to local firms and industries when a vocational education is removed?
The Research Proposal

Research Question:
- What happens to local firms and industries when a vocational education is removed?

Why should we care?
- Centralization in Vocational Education (Kraft, 2016)
- Industry and Voc Edu interrelations under-researched
Vocational Education in Denmark

Figure: Highest level of education, percentage share of total population between the age of 15-69, 2006-2015

1 Note: Based on data from www.statbank.dk.
Vocational Education in Denmark

Figure: Percentage of graduating students above primary school by level of education, 2005-2015

Note: Based on data from www.statbank.dk.
The Research Proposal

Research Question

• What happens to local firms and industries when a vocational education is removed?
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Theoretical Framework

Relevant Actors and Developments

- The Firms
- Vocational Education
- Students/Graduates
- Technological Development

Diagram:

- Schooling
  - Workers
- Technology
  - Firms

Output Market
Vocational Education in Denmark

Some background information

- Vocational education is a secondary education
- ... typically 4.5 years long
- ... with a 1 year intro
- ... and 3.5 years of apprenticeship and schooling
Vocational Schooling Theory

Theory of Knowledge and Learning (Lundvall and Johnson, 1994; Lundvall, 2004)

- Students accumulate knowledge through learning
Vocational Schooling Theory

Theory of Knowledge and Learning (Lundvall and Johnson, 1994; Lundvall, 2004)

- Students accumulate knowledge through learning
- Apprenticeship
  - Learning By Doing (Arrow, 1962)
  - Know-how
  - Particular to firm
Vocational Schooling Theory

Theory of Knowledge and Learning (Lundvall and Johnson, 1994; Lundvall, 2004)

• Students accumulate knowledge through learning
• Apprenticeship
  • Learning By Doing (Arrow, 1962)
  • Know-how
  • Particular to firm
• Schooling
  • Also Learning By Doing
  • Latest technology
  • Increase learning capacity!
Vocational Schooling Theory

- Student Learning Capacity and Knowledge

\[ C = F(A, S) \]

\[ A^j = \sum_i a^j_i \quad \text{Learning from activity } i \text{ at firm } j \]

\[ S = \sum_{h=1}^H s_h \quad \text{Learning from activity } h \text{ at school} \]

Higher \( h \) implies more modern technology

\[ \Delta F_{s_{h+1}} > \Delta F_{s_h} \]
Vocational Schooling Theory

- Student Learning Capacity and Knowledge

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Higher \( h \) implies more modern technology

\[ \Delta F_{s_{h+1}} > \Delta F_{s_h} \]

We can make a similar argument for the acquired knowledge
Vocational Schooling Theory

Why does it matter?

Schooling → Technology

Workers → Firms

Output Market

Firms will need capacity to handle new technology
• Worker knowledge and learning capacity
• Firm competitiveness

Why does it matter?
Vocational Schooling Theory

Why does it matter?

Firms will need capacity to handle new technology

- Worker knowledge and learning capacity
- Firm competitiveness
Hypotheses

I THINK YOU SHOULD BE MORE SPECIFIC HERE IN STEP TWO

THEN A MIRACLE OCCURS...
Hypotheses

The essence of the hypotheses

1. Non-local workers + higher wages
2. Substitution of worker skills + lower productivity
3. Local Industry Decline
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Data and Method

The primary take-away:

- Danish Register data
- PSM and $D-in-D$
Data

Initial Definitions

- Local Area
  - Municipalities (data-driven)

- Relevant industry/firms
  - The type of firms that tend to hire the graduates

- Case
  - A local area where a vocational education closes permanently
Register Data:

- Individual- and Firm-level information
- 1980-2013

Issue 1: Finding cases
Data

Register Data:

- Individual- and Firm-level information
- 1980-2013

Issue 1: Finding cases
Data

Cases

- 114 cases in the period 1990-2010
  - 55 Municipalities
  - 28 Educations
## Data

14 test cases

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guldborgsund</td>
<td>Joiner</td>
</tr>
<tr>
<td>Kolding</td>
<td>Mechanical Operator</td>
</tr>
<tr>
<td>Struer</td>
<td>Mechanical Operator</td>
</tr>
<tr>
<td>Sorø</td>
<td>Kitchen Assistant</td>
</tr>
<tr>
<td>Struer</td>
<td>Kitchen Assistant</td>
</tr>
<tr>
<td>Lolland</td>
<td>Technical Assistant</td>
</tr>
<tr>
<td>Køge</td>
<td>Technical Assistant</td>
</tr>
<tr>
<td>Horsens</td>
<td>Technical Assistant</td>
</tr>
<tr>
<td>Holbæk</td>
<td>Gardener</td>
</tr>
<tr>
<td>Halsnæs</td>
<td>Chef</td>
</tr>
<tr>
<td>Frederecia</td>
<td>Technical Assistant</td>
</tr>
<tr>
<td>Favrskov</td>
<td>Technical Assistant</td>
</tr>
<tr>
<td>Esbjerg</td>
<td>Mechanical Operator</td>
</tr>
<tr>
<td>Næstved</td>
<td>Mechanical Operator</td>
</tr>
</tbody>
</table>

Based on Register data
Data

Map of cases⁴

⁴Based on Register data
Methodology

PSM and *D-in-D*

- Identification through control cases
Methodology

PSM and *D-in-D*
- Identification through control cases

Endogeneity
- Administrative documentation on decisions
- Careful investigation of single cases
Methodology

PSM and *D-in-D*

- Identification through control cases

Endogeneity

- Administrative documentation on decisions
- Careful investigation of single cases

Changing industrial compositions, Business Cycles, etc?

- Higher aggregation level than industry
- Solution: *D-in-D*
Recap

Research Question:
• What happens to local firms and industries when a vocational education is removed?

Theoretical Framework
• Learning and knowledge in Vocational Education

Data
• Danish Register Data - firm level

Methodology
• Differences in Differences
Thank you for listening

