

*Push or Pull ? The Knowledge production  
and the determinants of the demand for  
research funding*

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ESSHRA Conference Berne  
12-13 June 2007

## Short CV

### Current positions

- Director, Swiss Co-ordination Centre for Research in Education
- Professor of Economics, University of Berne
- President, Swiss Federal Institute for Vocational Education and Training

### Selection of current national and international mandates

- Governing Board Member of the Centre for Educational Research and Innovation (CERI) of the OECD
- Swiss representative on the OECD's Education Policy Committee
- Advisor of the Expert Network on Economics of Education of the EU

# Research interests

- **Economics of Education (esp. Vocational Education and Training, Higher Education and Educational Finance)**
- **Comparative Educational Research & Indicator work**
- **Labour Economics**

# Structure

- 1. Research questions, method and data**
- 2. Pull factors: The response pattern of scientific disciplines to funding mechanisms**
- 3. Push factors: The response pattern of universities to the expansion of the higher education system**
- 4. Conclusions**

## Research questions, method and data

- 1) What are the factors determining the demand for research grants?
- 2) Are the reactions of scientific disciplines different to these factors (framework conditions, incentive structures, etc.)?
- 3) ... if yes: the results would mirror differences in the knowledge production in scientific disciplines

**Data:** Grant application data from the Swiss National Science Foundation (1990-2004) and matched data from the Federal Statistical Office.

**Method:** Panel data estimations (N = 140-280)

# Pull factors: The response pattern of scientific disciplines to funding mechanisms

**Pull-factors: Factors that attract the submission of research proposals and therefore knowledge production**

**Empirically testable factors all belong to the research funding instruments of the SNF**

- **Acceptance rate of submissions**
- **Degree of funding per grant**
- **Available funding for a scientific discipline**
- **Alternative research funding instruments (NRP)**

# Scientific disciplines

**Division I: Humanities, Literature, Social Sciences**

**Division II: Mathematics, Physics, Chemistry, etc.**

**Division III: Biology, Medical Sciences**

## Panel estimation: Dependent variable number of grant applications logarithmized by discipline group

Approved amounts Division I (Year t-1/t-2)	-1.93***
Approved amounts Division II (Year t-1/t-2)	0.13
Approved amounts Division III (Year t-1/t-2)	2.03***
Degree of funding Division I (Year t-1)	-0.58**
Degree of funding Division II (Year t-1)	-0.08
Degree of funding Division III (Year t-1)	-0.19
Acceptance rate Division I (Year t-1)	0.72***
Acceptance rate Division I (Year t-1)	-1.07***
Acceptance rate Division I (Year t-1)	-0.618***
NRP (Start)	-3.13**
NRP (Middle)	-5.74***
NRP (End)	-7.28***
N	247
N groups	19
Time periods	13

## Push factors: The response pattern of universities to the expansion of the higher education system

The expansion of the higher education systems affects the working conditions of researchers in many ways:

1. More students = more professors ⇒ **more grant applications, more knowledge production**
2. Number of students affects the number of professors with a time-lag with an average of 5 years = students/professor ratio worsens ⇒ **less grant applications less knowledge production**
3. Funding of universities does not keep pace with the expansion = less money per chair ⇒ **more grant applications and ??? knowledge production (substitution effects)**

## Panel estimations: Dependent variable number of grant applications per university

<b>Number of professors</b>	<b>0.72***</b>
<b>Student-professor ratio</b>	<b>-0.61***</b>
<b>Funds per professorship</b>	<b>-1.87e07***</b>
<b>N</b>	<b>140</b>
<b>N groups</b>	<b>10</b>
<b>N time periods</b>	<b>14</b>

## Conclusions I (Pull factors)

**Scientific disciplines react in a different way to financial incentives. The knowledge production must therefore be governed by different factors and rules.**

**Social sciences and humanities** seem easily saturated by favourable conditions and discouraged by unfavourable ones.

**Hypothesis: High sunk costs attached to research projects**

Favourable conditions wet the appetite for more in **natural & exact sciences and medicine** and unfavourable conditions trigger more effort to compensate for the reduced probability.

**Hypothesis: Low sunk costs (proposals can easily be duplicated or extended) and need for constant flow of funding (research infrastructure & research teams)**

## Conclusions II (Push factors)

**The expansion of the tertiary system had no effect on the knowledge production in the short term: Positive aspects (more professors but with a time lag) and negative ones (student/ professor ratio) offset each other.**

**The results indicate that disciplines with unfavourable student/ professor ratios and therefore a heavy teaching load (humanities and social sciences in Switzerland) are penalised in their research activities.**

## Conclusions III (looking ahead)

**More and more research is funded by third-money. Funding mechanisms and institutions play a more important role.**

**But...**

**Are the funding mechanisms equally adapted to all scientific disciplines and therefore, is knowledge creation equally well supported in all scientific fields?**

**⇒ More knowledge about the specificities of knowledge production in different scientific fields is needed!**

**Thank you!**