

# Does Knowledge Diffusion between University and Industry Increase Innovativeness

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# Outline of the Presentation

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- 1. The purpose of the paper
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- 3. Background
- 4. Data and variables
- 5. Methodology
- 6. Results
- 7. Conclusions

# The purpose of the paper

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- **A contribution to the rare quantitative assessment literature on the practical importance of the industry-university link.**
- **Today there is a lack of systematic data analysis of the innovation performance and economic consequences associated with knowledge diffusion between university and firms**

# The Research question

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- What is the importance of university collaboration on
  - (a) The firms' R&D investments
  - (b) The firms' propensity to apply for patents
  - (c) The firms' income from new product sales

# Background

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- Even though the practical benefits for the industry of much, or perhaps most university research emerges from indirect hard-to-measure processes,
- And even if universities in general are in the business of the creation and free dissemination of knowledge "for its own sake"

# Background

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- ...it is naturally unsatisfactory if the largest sector for basic research in the society is not properly evaluated.
- In particular governments, who in many industrialized countries, fund approximately 70-75 % of university research, are interested in the return of these investments.

# Selectivity Bias

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- A major problem with assessment studies in general, and most evaluation of the UI-link, is that they suffer from selectivity bias problem.
- The analyses are based on selected groups and therefore we cannot use the for generalization

# Selectivity Bias

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- **Those firms participating in university partnership are likely to be those with the targets innovation propensity,**
- **meaning that they will have more incentives to**
- **invest in R&D and more ability to produce innovation output, than those not collaborating**

# Data and variables

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- **CIS III, Sweden (2001)**
- **Original 2,114**
- **Drop low R&D sectors: Basic sample 1,505 obs**
- **Used sample 790 R&D firms**
- **25% have innovation cooperation with universities**
- **75% have not (control group).**
- **Matching sample: 192 collaborators and 192 twin (R&)firms not collaborating**

# Data and variables

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- Control variables (determinants)
- (1) R&D support/or not (Dymmy)
- (2) Valid patents ( History) (D)
- (3) Demand Pull variable (D)
- (4) Obstacles to innovation (finance, skill)
- (5) MNE/not
- (6) Market focus
- (7) Firm size
- (8) Export
- (9) Industry

# Methodology

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- **The research problem is to evaluate the effect of academic research on firms' innovation performance –**
- **But we do not know what would have happened in in the absence of university collaboration**

# Methodology

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- **A Cross-sectional propensity score matching estimator. The procedure**
- **(a) The propensity to collaborate with universities on innovation (probit)**
- **(b) A propensity score matches participants and nonparticipants based on their estimated probability of participation**
- **(c) The impact of research cooperation for innovation purposes is evaluated by comparing the average of the three performance measures between the groups of collaborating and non collaborating firms.**

Research project outcomes

## Probability of collaborating with universities is significant associated with

- Public R&D sup \*\*\* (+)
- R&D stock \*\*\* (+)
- Demand pull \*\* (+)
- Fin cost ob \*\* (+)
- MNE \*\* (+)
- (Firm size, market focus, export, lack of skill non significant)

## Results: Matching Estimator

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- **(1) The probability of collaborating on innovation with Universities is exactly the same for the actual collaborators as for the firms in the selected control group.**
- **(2) However, all three performance variables: R&D-intensity, innovation sales and the propensity to apply for patents differ significantly between the two groups**

# Conclusion, general

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- The study was able to establish that IU-collaboration had a significant and positive influence on three measures of innovative activity.

# Conclusion, (1)

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- **First, it was found that the average R&D firm that cooperated on innovation with universities spend more money on R&D compared with an almost identical R&D firm (nearest neighbours) which had no collaboration with academic researchers.**

# Conclusion, (2)

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- **Second, the results showed that the collaborating firms have a larger propensity to apply for patents than other R&D firms.**

# Conclusion, (3)

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- **Finally, it was showed that income from new product sales is considerable grater for a firm that have a joint research projects with universities than for a non-collaborating twin firm.**