

Evaluation of the Norwegian R&D tax credit scheme (SkatteFUNN)

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Dec 10, 2007

Outline of presentation

- What is SkatteFUNN?
- The evaluation: Topics
- The evaluation: Data requirements and sources
- Estimating input additionality
- Key results from other parts of the evaluation

What is SkatteFUNN?

- A system for tax deduction of R&D expenses in all enterprises
- Warranted by taxation laws
- 18 percent tax deduction of R&D expenses up to NOK 4 millions. If joint project with an approved R&D institution, the cap is NOK 8 million
- Smaller enterprises 20 percent deduction
 - <250 employees, turnover < € 250 mill or balance sheet total < € 27 mill, not owned more than 25 percent by larger enterprise

What is SkatteFUNN? (cont.)

- Launched in 2002 – SMEs only
- Extended to all enterprises in 2003
- Simple application and reporting procedures
 - Two weeks for application processing
- Research content is approved ex ante by the Norwegian Research Council
- R&D costs (basis for tax deduction) approved ex post by the tax authorities

Some key figures

	2002	2003	2004	2005	2006
Number of applications	3287	4739	4225	3176	2545
Approved applications	2798	3532	2762	2177	1772
R&D approved (mill NOK)	4104	7459	8155	7065	6677
Tax deduction (mill NOK)	690	1257	1382	1103	1082
Pct. paid as grants	82	78	76	74	73

The evaluation

- Initiated by the Ministry of Finance and the Ministry of Trade and Industry
- The Norwegian Research Council administers the evaluation
- Evaluation period: 2004 – 2007
- Evaluator: Statistics Norway
- Several reports published
- Final report to be published mid January 2008

Main issues in the evaluation

- Additionality: Does SkatteFUNN generate more R&D and change in R&D behaviour in enterprises?
- Returns: How do SkatteFUNN projects pay off?
- Real R&D or reclassification of costs?
- Does SkatteFUNN stimulate knowledge transfer from R&D institutions to enterprises?
- How does SkatteFUNN work together with other R&D stimulating measures?
- Administrative costs and efficiency

Data needs

- To study the effects of a tax incentive scheme for R&D, one needs a fairly long time horizon because the total economic effects of R&D cannot be expected to be visible in the short run.
- The data should cover a sufficiently long period both prior to and after the launching of the scheme.
- What should be regarded as “sufficiently long” can in principle not be established *ex ante*.
- In practice, one has to make a compromise based on the availability historical data, the cost of gathering new data, and the time horizon for the evaluation project.

Data sources

- Extensive use of comprehensive micro data bases for firms and plants
 - Many based on administrative registers
 - In addition: Manufacturing censuses, R&D surveys innovation surveys etc.
 - Use of common identifiers facilitates extensive linking of different data sources
 - Results in a unique panel data base for firms and plants, covering also a long period prior to the launching of the SkatteFUNN scheme

Data sources (cont.)

- The SkatteFUNN base (RCN)
 - contains all relevant information from firms' applications for tax exemption, such as description of the project etc, from the processing of the application in RCN, and from the firms' reports after the completion of the supported R&D project.
- Data from tax authorities
- R&D surveys questions related to the SkatteFUNN scheme.
 - This is done mainly to provide data for official statistics, but the information will be useful also for evaluation purposes.
- Specific surveys covering behavioural additionality and administrative aspects of the scheme.

Input additionality

- A key point in the evaluation
 - Important criterion in itself, cf. policy goals
 - Additionality a "necessary condition for success"
- Counterfactual question: What would R&D investments have been without SkatteFUNN?
- Non-experimental setting – no formal control group

Identification

- To answer what would have happened without SkatteFUNN requires analysis of microdata with a control group that can tell us what forms would have done in the absence of the scheme
 - Relevant comparison is not **”present vs past”**, but **”present vs counterfactual present”**
- Other macro-conditions than skatteFUNN may affect R&D investments.
- The design of the scheme precludes any **”smoking gun”** evidence

Main strategy

- Firms that would have done more R&D than the cap (4 mill NOK) in the absence of the scheme did not get any extra incentive to increase R&D investments
- We do a "difference-in-difference"-analysis
 - Assume that firms above the cap is a valid control group telling us what the growth in R&D for firms below the cap would have been in the absence of the scheme.
 - Compare the change in R&D investments for firms above and below the cap

Problem I

- The relevant is who would have been above or below the cap *in the absence of the scheme*
- Classify firms according to average level before the launching of the scheme
 - **Not perfect:** Changes not due to the scheme contaminate the treatment and control groups which underestimates the effect. "Regression-to-the-mean" pulls in the opposite direction
- More sophisticated prediction models give similar results

Problem II

- Would R&D growth be equal above and below the cap in the absence of the scheme? SkatteFUNN?
 - **Solution:** Remove largest and smallest R&D performers
 - ♦ Criterion : Max R&D >0 and < 40 mill
 - ♦ **But:** The more we do to solve problem II, the more we accentuate problem I
 - **Not perfect:** Cannot distinguish the effect of SkatteFUNN from other macroeconomic shocks that affect the treatment and control group differently

Econometric framework

- Estimate the demand for R&D
- SkatteFUNN is considered a discrete change in the marginal price of R&D for firms below the cap
- Fixed effect regression analysis
 - “Do firms do more than they use to when ...”
- Varieties of the specification

$$\ln(FoU) = \alpha + \beta_1 SF_{it} + \beta_2 SF_{it} * Du4 + \gamma'x_{it} + \alpha_i + \varepsilon_{it}$$

Short-term additionality

	(1)
Dependent variable	ln(intramural R&D)
ln(sales)	0,325*** (0,112)
Ln(offint)	0,358*** (0,022)
SkatteFUNN	1,498*** (0,253)
SkatteFUNN * below 4 mill	1,282*** (0,298)
Constant	0,619 (1,265)
Adj R-sq (within)	0,132
No. of obs.	8233

Other included vars.: Year dummies with cap interaction, firm fixed effects

Other findings

- Positive additionality mainly driven by firms that did very little R&D prior to SkatteFUNN
- Higher probability of new firms starting with R&D after SkatteFUNN
- No clear indication of whether long-term additionality is higher
- The effect of SkatteFUNN appears to be real in terms of increasing R&D man-years and increased used of skilled labour given output level.
- Additionality high compared to direct grants
- Additionality per krone taxes forgone in the interval 1.3-2.7

- In sum, we interpret the empirical evidence to be consistent with the Norwegian R&D tax credit being effective in stimulating private R&D investments.
- Results are broadly consistent across data sources and the model specifications.
- However, one should bear in mind that the identification strategy is not fully “waterproof”, and that a causal interpretation of our findings relies itself on assumptions that are not innocuous

Other parts of the evaluation

- Returns to SkatteFUNN projects
 - Effects on productivity/profitability as other privately financed R&D
 - Some effects on innovations (mainly processes and products new to the firm and not the market)
- No big effects on cooperation with R&D institutes
- Tax credit and direct grants complements in micro, substitutes in macro
- Some indications of exaggerated R&D costs
- Administrative routines good, but with some scope for improvement.