Funding R&D Cooperation between Firms and Universities

«The effectiveness of the Innosuisse Model»

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A new scientific study □f ETH Zurich, KOF Swiss Ec□n□mic Institute investigates the causal effect □f the Inn□suisse funding f□r j□int inn□vati□n pr□jects between private firms and public higher educati□n instituti□ns as research partners. The main results sh□w that the Inn□suisse funding increases firm sales by 21% and empl□yment by 18% □n average □ver the next 5 years c□mpared t□ n□t funded but □therwise similar c□mpanies. The effects □f the funding thereby increase □ver time. These results are n□t □nly in line with the p□sitive effects f□und by Inn□suisse's impact m□nit□ring, which is based □n firms' self-assessments, but als□ pr□vide valuable new insights int□ the dynamics □f the funding effects.

Introduction

The main instrument □f Inn□suisse is the funding □f j□int inn□vati□n pr□jects, □r R&D c□□perati□n, between private firms and public higher educati□n instituti□ns as research partners. This m□st imp□rtant funding instrument □f Inn□suisse aims t□ strengthen kn□wledge and techn□l□gy transfer (KTT). It targets the inn□vati□n capabilities □f firms t□ create effective value in markets. The study □f KOF Swiss Ec□n□mic institute pr□vides a causal estimate □f this Inn□suisse funding □n the empl□yment and sales figures □f firms in the years after c□mpleti□n □f funding. T□ identify the funding effect, it uses difference-in-differences meth□ds with a c□ntr□l gr□up □f firms that did n□t receive funding but □therwise resembles funded firms f□r defined characteristics.

A twofold selection bias

T□ estimate the causal effect □f the funding, □ne cann□t simply c□mpare the mean perf□rmance □f funded firms with the mean perf□rmance □f n□n-funded firms. Such a c□mparis□n w□uld suffer fr□m a tw□f□ld selecti□n pr□blem and thus deliver biased estimates. First, firms self-select int□ the Inn□suisse funding and, sec□nd, Inn□suisse selects pr□ject applicati□ns. A simple mean c□mparis□n w□uld likely lead t□ an □verestimati□n □f the funding effects, because better firms with higher quality pr□jects w□uld likely get funded m□re □ften. These firms w□uld als□ with□ut the funding have delivered higher perf□rmance effects than the □ther firms with the in c□mparis□n l□wer quality pr□jects. A simple mean c□mparis□n w□uld then be a c□mbinati□n □f the actual funding effect t□gether with this tw□f□ld selecti□n bias.

Difference-in-differences

T□ address the tw□f□ld selecti□n pr□blem, the study uses difference-in-differences (DiD) meth□ds that c□mpare □ver time the perf□rmance □f firms funded by Inn□suisse with the perf□rmance □f a c□ntr□l gr□up □f n□n-funded firms. The central assumpti□n □f a DiD is that with□ut the funding, the funded firms w□uld have devel□ped in the same way as the n□n-funded firms. T□ make this assumpti□n m□re plausible, the study uses f□ur imp□rtant firm characteristics (i.e., exp□rts, empl□yees with a tertiary

degree, R&D expenditures, and number □f c□mpetit□rs) t□ build a c□ntr□l gr□up □f n□n-funded firms that is very similar t□ the funded firms. If the central assumpti□n □f a parallel devel□pment h□lds, the difference in the perf□rmance □utc□mes between the funded firms and the c□ntr□l gr□up □f n□n-funded firms is then the causal effect □f the Inn□suisse funding. One can pr□vide s□me evidence f□r plausibility □f the DiD if the perf□rmance bef□re the funding is similar f□r b□th gr□ups. The study finds evidence in line with this placeb□ test, as □ne can see in Figures 1 and 2. Bef□re the Inn□suisse funding, there is n□ significant difference between funded and n□n-funded firms in all peri□ds.

Data sources

The study uses several waves □f three different surveys c□nducted by the KOF Swiss Ec□n□mic Institute. These surveys are based □n a stratified rand□m sample that is representative □f the entire Swiss ec□n□my. In additi□n, the study uses data fr□m three waves □f a survey □n the p□pulati□n □f firms that applied f□r Inn□suisse funding in 2019, 2021 and 2023. C□mbining these data sets results in a c□mprehensive firm-level panel data set ranging fr□m 2010-2022, with 3220 firm-year □bservati□ns and 920 unique firms, □f which 383 are funded firms and 537 n□n-funded firms. There are three different c□h□rts □f funded firms: 2017-18, 2019-20, and 2021-22. Since the data ranges back t□ 2010, we have a maximum □f "t-12" years bef□re the funding and "t+4" years after the funding. The results □f □ur baseline specificati□n are sh□wn in Figures 1 and 2.

Results

Figure 1 and 2 sh□w the differences in empl□yment and sales between the funded firms and the c□ntr□l gr□up □f similar but n□n-funded firms. Bef□re the Inn□suisse funding, b□th gr□ups devel□p similarly, while after the funding they diverge. The y-Axes sh□w the change in firm empl□yment (Figure 1) and firm sales (Figure 2) and the x-Axes the years relative t□ the treatment (i.e., the Inn□suisse funding). The funding happens s□mewhen between year "t-2" and "t". The rectangles are the p□int estimates, while the lighter shaded bands c□rresp□nd t□ 99% and the darker shaded bands t□ 95% c□nfidence intervals. In Figure 1 the Inn□suisse funding sh□ws statistically significant effects □n empl□yment that increase □ver time, with an average effect □f 17.6% after five years. The effects □n sales in Figure 2 are similar, with an average effect □f the funding □f 20.7% after five years. Further analyses in the study sh□w that the funding effects are str□ngest f□r the firms c□□perating with the ETH d□main and the universities □f applied sciences.

Comparison

The results □f the study align with the p□sitive impacts □f the Inn□suisse funding f□und in the Impact M□nit□ring □f Inn□suisse. Whereas the Impact M□nit□ring uses self-assessment □f firms and simple but intuitive meth□ds, the study at hand uses state-□f-the-art ec□n□metric meth□ds and relies □n effectively realized sales and empl□yment figures. The applied meth□d all□ws f□r a l□ng-term quantitative tracking □f the Inn□suisse funding effects that can als□ evaluate whether it impr□ves □ver time.

Figure 1: The effect of the Innosuisse funding on firm employment

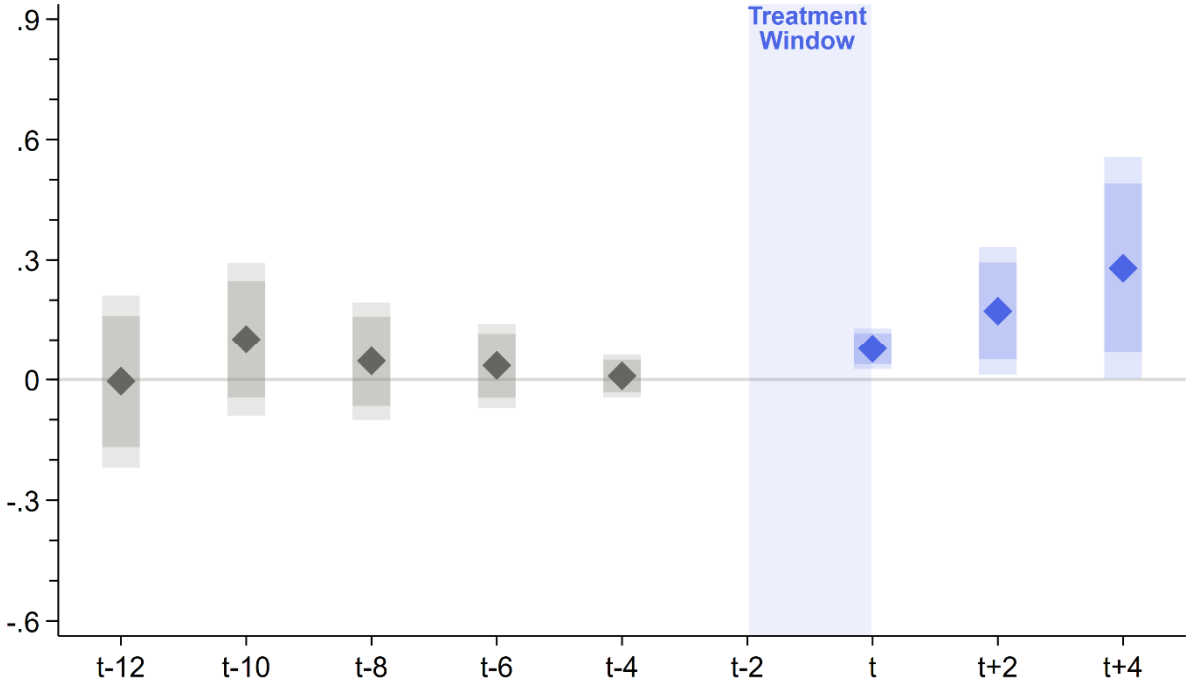

Figure 2: The effect of the Innosuisse funding on firm sales