

# **Push or Pull?**

## **Knowledge production and the determinants of the demand for research funding**

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### **Abstract**

Research at universities is increasingly being financed through research funding agencies and, in a parallel development, increasingly less through the general funds appropriated to universities and, by extension, to professorial chairs. The financing of research through external agencies is said to contribute to an improvement in the quality of research output by virtue of the competitive components involved in the research grant process. Irrespective of the shifting significance of these two funding channels, research funding agencies in many countries are generally being showered with a practically exponentially growing number of research funding applications. The present study investigates, based on an analysis of the Swiss National Science Foundation (SNSF), to what extent the growth of the tertiary education system has contributed to the rapid rise in applications for research grants during the past several years and whether the given structures of research funding agencies and the funding possibilities they offer might also be a factor for the strong increase in grant applications.

This investigation is in many ways explorative in nature because no similar studies, neither theoretical nor empirical, have been conducted in the past. The initial results of this investigation do reveal, however, that the differing behaviour and the differing response patterns of researchers in different scientific disciplines should, whenever the issue of demand for research project grants is under discussion, be an object of scientific investigation. Such investigation is likely to generate new insights into the production of knowledge in the individual scientific disciplines.

In this study two groups of hypotheses that are of relevance in a theoretical sense were investigated even though there actually is no real theory on the factors determining the number of research grant applications at national research funding agencies. These two groups of hypotheses differ in that the first group covers “push” factors, i.e., those factors that are defined by the environment in which the grant applicants work and conduct their research. These are factors that directly influence the likelihood that researchers will submit an application for a research grant. The second group, the “pull” factors, comprises those factors that are determined by the research funding agencies themselves, in this case the Swiss National Science Foundation, due to the various ways in which they are organized and operate; they have a direct and indirect influence on researcher demand for grants.

The empirical analysis (panel analysis with some 260 observations) of the determinants of the factors influencing the demand for research grants shows that the institutional features and the funding mechanisms of the funding agencies play a prominent role as well as the expansion, the financing and governance of the tertiary system.

Concerning the funding agency, the “pull factors”, it can be shown, that the financial resources at disposal, the institutional settings and the instruments for financing research can trigger new requests as well as put off new applicants. The most interesting result found so far is, that the different scientific disciplines react in a very different way to the same circumstances and incentive structures, which points to the fact that the knowledge production in the different scientific fields must be governed by quite different factors and rules. Whereas the humanities and social sciences seem to be easily saturated when the opportunities for more research grants are ameliorated, the same situation “wets the appetite” for more research money in the field of medical sciences. At the same time a reduced probability that a research proposal is accepted discourages the number of applicants in the humanities and social sciences, whereas in the natural, exact and medical sciences it triggers more proposals in order to compensate for the reduced probability of acceptance. Saturation and discouragement for the humanities and the social sciences could be an indication that rather high sunk costs are attached to research proposals. This leads to a situation where refused proposals cannot easily be replaced by new ones nor can accepted proposals be easily supplemented by additional ones. In the other scientific disciplines the different reaction to a change in the research funding framework shows that on the one hand that favourable conditions can be exploited rather easily and that because of the need for a constant flow of research money, deteriorating conditions have to be compensated by an increase in the requested grants. The fact that these disciplines can react and adapt the production of proposals in the short run also means that the cost of a single proposal and the possibility to replace refused proposals with new ones must be quite different than in the humanities and the social sciences.

As regards the expansion of the tertiary system, the “push factors”, it can be noted that this has an impact on the number of requests for research grants but a net effect can only be expected in the long run. More professors – as expected – seek more research money and therefore push the number of proposals to the funding agencies. Due to the fact that the personnel and finance resources allocated to the universities only react sluggishly to the expansion in the number of students, the student/professor ratio and the finance per chair ratio deteriorate in the short term. Whereas the unfavourable student/professor ratio decreases the number of requests for grants because professors are tied up with teaching, the decrease in the financial resources per chair causes the opposite. Professors have to look for outside money if the resources at their university do not keep pace with the expansion. This provokes two counteracting factors, with the consequence that the expansion has no net effect in the short run.

The findings have to a certain extent pioneering and exploring character. Therefore future research should – to our view – analyse further whether the high degree of uniformity of the instruments of research funding agencies is equally suited to all scientific disciplines. The same holds for the effects periods of expansion and contraction of the tertiary system can have on the knowledge production in individual scientific disciplines.