

Is the commercialization of European R&D weak?

- A critical assessment of a dominant belief and associated policy responses

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C I R C L E

Technology Transfer and the European Paradox

- The perception of a strong European science base which is not translated into economic growth
“European firms and governments must therefore redeploy their efforts, improve their capability to translate [research] into commercial successes”. (EU Green Paper on Innovation, 1995)
- Over time, focus has shifted to the commercialisation of *publicly* financed R&D (European Commission, 2007):
“One important problem is how to make better use of publicly funded R&D. Compared to North America, the average university in Europe, generates far fewer inventions and patents.”
- The policy response is to strengthen the management of knowledge and intellectual property by European Universities:
“This is largely due to a less systematic and professional management of knowledge and intellectual property by European universities.”

The Swedish paradox

Initially, in 1991, focussed on the relation between high aggregate R&D intensity and a perceived weakness in the “high tech” industry.

After the “European Paradox” was coined (1995), the Swedish policy debate began to focus on the narrower “academic paradox”

Government Science Policy Bill, 2008:

- *“Research results have too rarely led to jobs, new products and growth in Sweden”*
- *“The Universities’ incentive to work with commercialisation and with research of relevance to industry has been relatively limited. Seen from an international perspective, there are relatively few products and firms that in reality have come directly out of an academic environment.”*
- *“The outflow of patents and licenses from research at Universities and University colleges is at a relatively low level given the extent of Swedish research...”*

A critical assessment of a 'dominant belief' and associated policy responses

The purpose is to critically

- a) assess the validity of the belief in a poor commercialisation of academic R&D, and
- b) discuss the currently proposed solutions, inspired by US Science Policy, to handle that alleged problem by focusing on the ownership of IPR.

- We limit ourselves empirically to the Swedish case since it is of particular value for a detailed analysis
 - i. we briefly outline the emergence of the belief.
 - ii. we scrutinize the empirical foundation of the literature that upholds that belief ...
 - iii. ... as well as empirical indications that cast serious doubt on it.

In spite of the shaky empirical evidence, there is a strong pressure to change the institutional framework...

The belief is based on the perception that in an international perspective:

- the academic sector's **relevance to industry** is poor
- there is a paucity of **patents and license agreement** emanating from the academic sector
- there are few **academic spin-offs** and these firms remain small

- The OECD has repeatedly argued for a Swedish abandoning of the “Professor’s privilege”
- Since the adoption of the Bayh-Dole Act by the United States in 1980, a number of OECD governments have implemented policies that closely resemble it

“Several Member States have taken initiatives to promote and facilitate knowledge transfer (for instance new laws, IPR regimes, guidelines or model contracts) and many others are planning to intensify their efforts in this direction.” (European Commission, 2007)

Scrutinizing the empirical evidence: industrial relevance

- Two features in the Swedish innovation system may suggest that the benefits are significant.
 - University spin-offs act as research boutiques (44% of technology traded in Sweden originated in university spin-offs) – indirect impact
 - Strong relationships and networks between academia and larger firms.
- Wigren and Wahlbin (2008): 15.6 % of the researchers participated in the development of a product or service in 2006. 75% did so together with an external organisation.

Scrutinizing the empirical evidence: patents

- This belief is perhaps the most surprising as there is no relevant data collected by the Swedish Government.
- Individual researchers own the IPR – not the universities (collecting such data is very difficult in Sweden)
- Until very recently no international comparisons have been made

Wigren and Wahlbin (2007):

- In 2006 1.8% of Swedish researchers applied for a patent (115/500 applications)
- This corresponds to 4.6% of Swedish patents

Lissoni et al. (2009), Geuna and Rossi (2011):

- In Sweden, the share of academic patents is, *at the same level* as in the US (6 per cent)
- the difference is that most of these are owned by firms collaborating with the Universities (82% in Sweden, 24% in the US)

Scrutinizing the empirical evidence: academic spin-offs

- First, the empirical base is scattered (a few empirical studies from the 1980s and 1990s). The data includes mainly firms that are very young (normally it takes a decade or so before firms start to grow)
- Second, the coverage is only Swedish firms so no international comparisons were made.
- At the turn of the millennium, there was not any conclusive evidence for claiming that new Swedish technology-based firms and university spin-offs do not grow

external entrepreneur firm c. 100	indirect university spin-off firm c. 400
side-line firm c. 175	direct university spin-off firm c. 200
yes	no
academic researcher staying at university	

Table 2: Swedish, British and US university spin-offs (source: SCB, HE-BCI and AUTM)

	Sweden (SCB) ^a	UK (HE-BCI) ^b	US (AUTM) ^c
2010	na	268	651
2009	348	206	596
2008	396	191	595
2007	366	221	555
2006	388	226	553
2005	381	187	527
2004	378	148	462
2003	259	167	Na
Average	359	202	563

- There are between 200 to 900 Swedish academic spin-offs each year – is this a high or a low figure?
- US: 2/3 of business started by academics are not based on disclosed and patented inventions
 - 18% (122 of 682) patent-based start-ups “bypassed” the IP system
 - over 33% of patents awarded by university faculty were bypassing patents, over 42% of the scientists bypassed their institutions at least once (Markman et al. 2008)
 - Åstebro et al (2012) estimated c 2500 USOs/year
- AUTM figures underestimate USOs (3-5 times)
- UK underestimate/bypassing?
- To estimate the economic value of (publicly funded) university research we need systematic data on the depth and breadth of academic entrepreneurship – inside as well as outside of the Formal IP system.

European copy cat behaviour may be counterproductive, it involves risks in terms of

- obstructing the formation and effective operation of university-industry networks;
- reducing frequencies of entrepreneurial spin-offs,
- biasing the types of technologies focused on,
- costing the Universities sums that they may not be willing to spend.
- Awarding Universities the IP rights risks hampering rather than promoting technology transfer.

The policy discourse draws on an empirical foundation which is very unsatisfactory...

Conclusions and implications

- Large methodological problems, in particular an absence of considerations of time lags, as well as empirical problems
- The policy discourse draws on an empirical foundation which is very unsatisfactory. Policy needs to be based on documented evidence which is referred to by the Government
- Whilst many of the benefits that come out of academic research are difficult to quantify efforts have to be made to measure those that can be measured
- It is of vital importance that the policy makers have the required competence, back-up and working conditions that allow them to critically assess proposals
- Finally, waiting for a real evidence based policy should not stop us from trying to improve the social and economic value of academic research.
- In this task, it is, however, essential to include an assessment of the many benefits which are difficult to quantify. Here we need to go much beyond the current focus on spin-offs, patents and licenses and include more subtle, yet vital, benefits