



DRIVERS OF ACADEMIC RESEARCH IN INDIA AND THE ROLE OF IPR: SOME ECONOMETRIC EVIDENCE

Amit Shovon Ray *and* Sabyasachi Saha



OUTLINE OF PRESENTATION

- Public Funded Research in India: Stylized facts
- The Role of IPR
- Drivers of Academic Research in India: Econometric Evidence
- Lessons for institutional reforms



PUBLIC FUNDED RESEARCH IN INDIA:



Stylized facts

- Importance of public-funded research in India
 - 74.1 percent of total R&D expenditure in 2005-06 borne by the government, although India's R&D expenditure as percentage of its GNP is rather low by international standards.
 - Extensive network of government funded institutes of higher learning, universities, institutions and laboratories – engaged in teaching, training and research.
- Research outputs
 - **Publications** facilitate dissemination of research results in the public domain and establishes natural copyrights
 - **Patents** protect Intellectual Property Rights on university inventions as a conscious and concerted effort to facilitate technology transfer
 - Publications by far outnumber patents, the recent trends of rising patenting activity notwithstanding
 - 75% of all patents granted in India are to foreign citizens (2006-07)



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■ General Observations

- Enormous heterogeneity in the quality of institutions and their research potential.
- Often contended that though public funded system of higher learning has been successful in generating adequate scientifically trained manpower, it has not contributed significantly to usher in competitiveness and technological learning by the Indian industry.
- Despite active research pursuits, industry interface has remained sub-optimum as reflected in patenting, licensing and commercialisation of university research. In our sample
 - Less than half of the faculty members have engaged in patenting activity.
 - Only a handful of university patents have been licensed
 - Examples of successful commercialisation of these licensed innovations are hard to come by



THE ROLE OF IPR:

- Intellectual Property Rights related concerns did not bother Indian scientists for long. Dedicating research outputs to public domain for free use and follow-on research has been a standard practice – *lethargy* towards active participation in commercialization of inventions on the part of Indian academic community?
- Do present IPR provisions for academic research in India pose a serious bottleneck in facilitating successful commercialization of university innovations?
 - Evoked considerable policy debate.
 - Concerted effort to put in place institutional framework for IPR on public funded research in India along the lines adopted by CSIR in the recent past.



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- Proposed Indian Bayh-Dole
 - Attempt to streamline IPR provisions by allocating patent rights to universities and institutions (identified as 'recipients' in the bill) over the inventions arising out of government research grants.
 - Objective is to incentivize industry to pick up and develop university generated ideas and prototypes.
 - Incentivizing faculty research?
- Naturally, a proposal to institutionalise IPR in Indian academia, along the lines of the US Bayh-Dole act, mooted by the Indian government, needs to be examined with a thorough analytical understanding of the *drivers of academic research in India* not only in terms of its culture and environment but also *faculty behaviour, performance and perceptions*.

DRIVERS OF ACADEMIC RESEARCH AND IPR

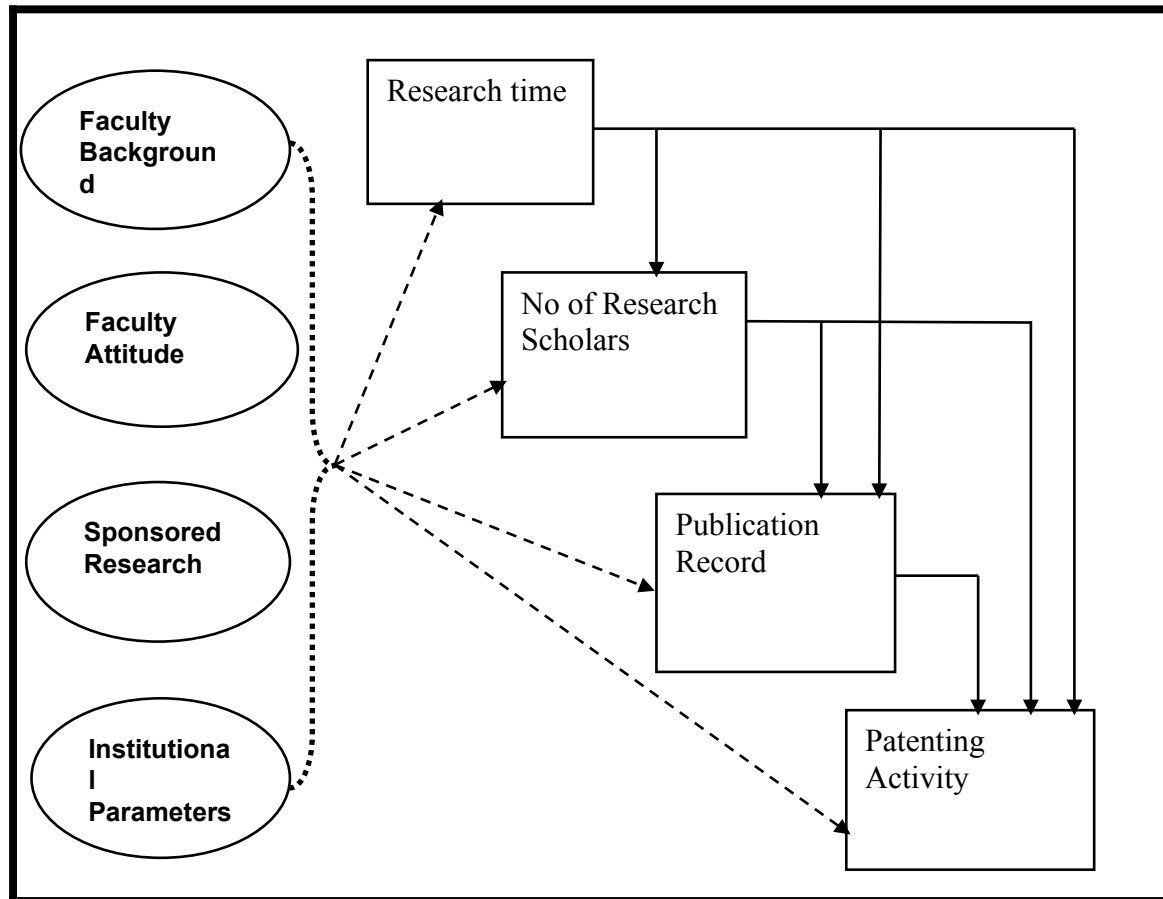


Fig. Drivers of Academic Research – A schematic framework



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An economist's job of testing of hypothesis should not be understood as a means to impose ideas and preconceived notions but should only be used to establish the possible theory hidden in facts. It is here that there is a difference between findings from a survey using descriptive statistics and placing the data through rigorous procedures of statistical testing of hypotheses and econometric analyses. The latter cannot go without a theoretical argument in line of support.

Some of the hypotheses that we tested:

- Junior faculty have greater research drive, as reflected in their research inputs as well as research outputs.
 - Designation/ length of experience don't matter except for patenting activity (see later)
- Faculty trained abroad have different exposure and may differ significantly in their research behaviour and performance vis-a-vis their counterparts trained in India.
 - Again, foreign PhD does not matter, except for patenting activity



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- Faculty with industry experience will be more inclined towards patenting activity
 - Surprisingly no
- Faculty who publish with career advancement and/ or recognition in mind end up publishing more
 - Surprisingly, they end up publishing less – intrinsic versus extrinsic motivation for research and publication
- Sponsored research acts as a driver of academic research in India, with a significant positive influence on research time devoted, number of research scholars and also the number of publications and patents.
 - Even if a faculty has a larger portfolio of sponsored research, it does not ensure that she will devote more time to research or will have a higher rate of publications or would be more active in patenting. Our results only confirm that faculty with sponsored research supervise more scholars than others.



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Additionally, with faculty patenting activity in perspective

- We find evidence in support of our hypothesis that a faculty with a doctoral degree from abroad is more inclined to patenting
- While professors seem to be patenting more, at the same time years of academic experience might negatively affect patenting, possibly indicating that dynamism of the younger generation of faculty combined with the academic maturity of the professorial level proves to be the ideal combination for encouraging university patents.
- As stated earlier, job experience in the industry may not result in increased faculty patenting activity
- Interestingly, however, we have found that a positive attitude towards research supervision positively affects faculty patenting activity even if there may not be a direct causal relation.
- Finally, we did not find IITD faculty to be anyway more inclined towards patenting relative to JNU, their organisational structure for facilitating IPR management and industry interactions notwithstanding.



LESSONS FOR INSTITUTIONAL REFORMS

Objectives of the proposed Indian Bayh-Dole may be summarised as:

- Energise academic research and encourage patenting
- Facilitate technology transfer

What do our results indicate?

- Given the heterogeneity (in quality and infrastructure) prevalent in Indian academia, we possibly need to identify a target group which is likely to respond to this institutional change, most effectively. Our research shows
 - Faculty with a Ph.D. degree from abroad
 - Younger faculty but with professorial maturity and dynamism
- Industry exposure does not translate into greater patenting activity.
- Importance of organizational structures and systems
 - Organizational structures in the form effective TTOs are perhaps necessary but definitely not sufficient to create better IP culture in academic research and facilitate commercialization of university inventions
 - Ultimately, it is faculty motivation and perceptions that would play the key role in this process



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- This brings us to the debate that contrasts extrinsic versus intrinsic motivations behind academic research
 - We fail to find evidence of extrinsic motivations driving faculty research. Intrinsic motivation still dominates the mindset of Indian academic profession.
 - Hence formalising IP as a faculty incentive (financial rewards) is not the correct approach to sell the idea.
 - Impress upon the social obligation of academic scientists to ensure that even their rudimentary 'innovative ideas' be picked up by industry for development and commercialisation, wherein IP only acts as a vehicle.
- Resolving issues of conflict in the minds of the academic world
 - Patenting versus publishing: There may be two aspects to the prevailing confusion on conflicts between patenting and publishing – philosophical and operational.
 - Exclusive versus non-exclusive licensing: ...?...



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- Finally, technology transfer
 - Although there is very few examples of actual technology transfer activity, faculty members appreciate the fact that they benefit from industry interactions. Faculty engages in industry interface attracted by the myriad applied research questions that industry brings – as we understand motivations for such interface goes beyond mere financial rewards.
 - Even if industry is not forthcoming in funding *basic* research at universities, on instances of actual interface it has been the industry, which has been approaching the faculty member individually in most cases – but mostly for immediate problem solving rather than for tapping long term inventive ideas.
- It is not the case that university and industry tend to remain shy of each other – rather the quality and level of engagement must be augmented to tap inventive ideas in academia for industrial applications – streamlining IP culture is expected to give this process a fillip.



Thank You