Druid debate on patent data

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NBER data

Along with several collaborators, I am going to release another version of the NBER patent data file soon. Clearly we must think these patent data are good for something!

Question at issue

Should we discourage the use of patent data to measure innovation in order to improve the quality and impact of empirical research in industrial dynamics?

Take the second half of that statement: using patent data is very low on the list of changes that would improve the quality and impact of empirical research in industrial dynamics. Here are some things which I think are much more important:

Improvements to research

1. Better understanding of the strength and weaknesses of the "scientific method," especially in the management literature.
2. More careful consideration of exactly what the variables measure, including those variables based on patents and patent citations, and more attention to the quantitative meaning (and plausability) of the results obtained using these variables.

The question here is about the role of patent data in empirical research

My argument is simple: We are not so rich with data that we can afford to discard an entire collection of them, even though they may have some problems.

It is true that patents are more closely associated with invention than with innovation. Therefore one might think they are not a good indicator of innovation. However, invention and innovation are strongly related and we lack good measures of innovation for a wide range of firms and technologies.

The use of "proxy" variables for non-observable quantities is a well-understood methodology and can yield good results in the right hands and using good methodologies.

Examples

The most highly cited US patents in the 1980s and 1990s are clearly associated with innovations as well as inventions:

- 1980s:
  - bubble jet and ink jet technology of Canon;
  - DNA amplification technology of Cetus;
  - disposable diaper technology of Proctor & Gamble
- 1990s:
  - CDMA technology of Qualcomm;
  - Large scale photolithographic solid phase synthesis of polypeptides of Affymax;
  - Pressure sensitive material for wrapping an object (flower pot) of Highland Supply;
  - Web browser with dynamic display of linked objects, now owned by Acacia.

Comments

It is true that the majority of patents are not like these, being either minor modifications, or essentially worthless for innovation, but in general even this type of patent, taken in the aggregate, gives us an idea of where in technology space firms, institutions, and individuals are operating.

The skewness in importance and value does suggest that we might need more inventive ways of using these data.

What's the alternative to patent data?

- The leading proxy variable is R&D. However, R&D does not capture all innovative activity either; many firms, especially smaller firms, patent without reporting R&D. Some R&D is unproductive. More importantly, R&D rarely comes broken down by technology area.
- Hand collected innovation data obtained by asking industry actors – costly and possibly subjective and/or selective.
- New product announcements (sampling issues, not always available)

Have patent data been useful?

Yes, Joanne will discuss some examples.

Even if one doesn't believe in patents as indicators of innovation (which is what we are focusing on), there are a number of indicators that patents are important to firms – associated market value and profits, enablers of markets for technology – suggesting that they are an important part of technology firm strategy.

Patent data can motivate research that uncovers interesting firm behavior. E.g., my paper joint with Ziedonis was driven by observations made using patent data for the semiconductor industry as well as by results from the Yale and Carnegie-Mellon surveys. By looking at patent data we learned that in an industry that viewed patents as unimportant for securing returns to innovation, patenting intensities were high and growing, an apparent conflict, that was ultimately explained by an industry-wide shift toward strategic patenting.

Concluding statement

We should encourage the ***more careful*** use of patent data to measure innovation in order to improve the quality and impact of empirical research in industrial dynamics.