PAI 776 – The Economics of Science and Technology
Professor David Popp **Spring 2014**

Guidelines for the Research Paper

The major assignment for this class is the research paper. The goal of this assignment is to get you thinking about issues raised in class. In particular, the paper should make you think about how the work we do in class relates to a real-world issue. For the paper, you should apply the materials of the course to a current issue in science and technology policy. The problem may be one that has been addressed in policy circles, or one that hasn't been addressed, but that you think should be. You may choose to argue that a problem is being addressed incorrectly, or even that it shouldn't be addressed at all (e.g. that the problem is not serious enough to justify government intervention). Several suggestions for topics are listed at the end of this handout. Your paper should begin with a brief description of your issue, and include a review of the theory that is relevant to your topic. The main portion of the paper should apply the theory to the topic at hand in a way that allows you to draw *your own conclusions* about the topic of your paper.

Note that you are free to cite the views of others in your paper. However, the final paper must be *in your own words*. You should not quote directly from a paper unless the exact wording of the author is important. Rather, you should incorporate materials from other sources into your paper using your own words. Finally, when you use ideas, facts, or analysis taken from another source, it is important that you cite the source. This is true *whether the material is directly quoted or merely paraphrased*. Be aware that failure to properly acknowledge the contributions of others can be considered plagiarism and will be severely punished.

The research paper will be due at the beginning of our last class meeting **Monday, April 28**. It should be between 10 and 15 pages, double-spaced. To get you thinking about a topic, a short (one-page maximum) statement of your topic will be due on **Wednesday, March 5** The short paper should state what your question is, why it is of interest (to you and others), and include some preliminary ideas of how you will proceed. You are encouraged to come talk with me about paper ideas well before the March 5th deadline. *Even though this is not due until March 5, you should begin preliminary research on a topic soon! The late due date is to give students a chance to see what topics covered in class interest them, and to allow time to do some preliminary research on these topics.*

I have included information on locating sources and on potential topics. The list of topics should help you get started; however, you are encouraged to come up with a topic on your own. You are more likely to write a successful paper on a relatively narrow topic (e.g. should software be patentable?) than on a broad topic (e.g. are patents good or bad?).

Finally, note that the paper requirement for Ph.D. students is slightly different. Rather than simply analyzing a policy question, Ph.D. students should prepare a research proposal. The purpose of this assignment is to get you thinking about doing your own research, and to force you to think more carefully about the methods used by economists. Note that I do not expect you to carry out your proposal by the end of class. One semester is not enough time to do Ph.D. quality research. Rather, your paper should:

1) State the question that you propose to address (note that for most of you, the question is likely to be inspired by a policy issue, although that isn't necessary),
2) Summarize the existing literature on this topic,
3) Show how your proposed research contributes to the literature in this area, and
4) Propose how you would go about answering your question.

Helpful Resources

To get started, you may find it helpful to check current events magazines, such as the *Economist*. In addition, the *Journal of Economic Perspectives*, which is the source of many of the articles on the reading list, is written to be accessible to a wide audience, and often have articles pertaining to technology issues. One specialized journal that is of particular use is *Research Policy*. This journal aims at a multidisciplinary audience. In addition, general-interest economic journals such as *American Economic Review* often include articles related to science and technology. In particular, the *RAND Journal of Economics* publishes several articles a year on science and R&D. Be warned, however, that these articles are often technical in nature.

To find journal articles, the best place to look is on EconLit. This is available on-line from the SU library. To access it, go to:

http://library.syr.edu/

Once there, click on:

Databases

From there, you can search for individual database titles.

The National Bureau of Economic Research (NBER) has a large repository of working papers on science and technology. Most of these papers are written by members of NBER's Productivity, Innovation, and Entrepreneurship Program. From their site, you can browse all working papers by program members, or search for specific topics (http://www.nber.org/programs/pr/pr.html).

NBER also produces an annual book series on Innovation Policy and the Economy. Individual chapters are available at http://www.nber.org/booksbyseries/IP.html. These books are aimed at policy makers. The articles are good non-technical reviews of economic theory and practice relating to science policy.

If you are looking for statistics, the Internet can be a great help, if you know where to look. In particular, when using the Internet, pay close attention to the source of your information. Many groups with specific agendas have sites on the Internet. ***Be aware of the policies being advocated at a particular site when examining their information and considering its credibility.*** Should you need any assistance in finding a topic or a source, please do not hesitate to ask. When looking for data, the following are some useful sources:

- Perhaps the most useful page for economists is *Resources for Economists on the Internet*, found at:
  http://rfe.org/

- The U.S. government also has many useful sites. For starters, the National Science Foundation's Division of Science Resources Statistics has several useful publications. Their home page is:
  http://www.nsf.gov/statistics/

- A wide range of US patent data is available through the US Patent and Trademark Office (USPTO), at:
  http://www.uspto.gov/
  A searchable database of US patents can be found at:
  http://www.uspto.gov/patft/index.html
  If you are simply interested in aggregated statistics (e.g. patent counts by year, for certain firms, etc.), you might also check the statistical reports prepared by the USPTO. These can be found at:
  http://www.uspto.gov/web/patents/stats.htm

- International patent data is available from a couple of sources. This data may be more difficult to comb through, as it helps to be familiar with the nature of the data from each country. However, I'm happy to help any interested students use the data.

  First, international patent data can be found in the INPADOC/Family and Legal Status database. A link to this database is available on the electronic database page of the Syracuse University library.

  Alternatively, the European Patent Office provides a free patent database containing information from over 50 countries. The database is available at:
  http://worldwide.espacenet.com/

- Links to these, as well as many other useful sites, can be found on the useful links section of the class home page:
  http://classes.maxwell.syr.edu/pai776/index.html

Suggested Research Paper Topics

Some suggestions for paper topics are included below. This is not meant to be a comprehensive list, but rather a way to get you thinking about potential topics. Your topic need not come from this list, and I would encourage you to consider topics not on the list that meet your personal interests.

Write a case study of the development of a successful technology. What role did public policy play in the development of the technology?

Should software be patentable?

Should business practices be patentable?

Should discoveries about the human genome be patentable?

Is harmonization of patent policies good or bad for developing countries?

What role should government R&D play? Should it only focus on basic research, or is applied government R&D also appropriate?

Evaluate a public R&D program. Has it generated sufficient benefits to outweigh its costs?

Evaluate a technology incentive implemented by a local or state government. Has it worked?

Is the US Court of Appeals devoted specifically to patent cases a good idea? How has it affected R&D in the US? Should other countries follow the US example?

How can intellectual property rights keep up with the digital age?

Compare and contrast the science and technology policies of two countries. Do any differences seem appropriate? Are their lessons each country can learn from the other?

What can developing countries do to encourage technology transfer? What can *developed* countries do to encourage technology transfer?

What can we learn from the development of new technologies such as software or biotechnology that can help guide policy relevant to the emergence of nanotechnology?

Should the US adopt a patent opposition system, such as is used in Europe?

Should tax credits for R&D be expanded?

What effects do government laboratories have on research? Here you might choose a specific laboratory and do a case study of the effects of that lab.

What effect does university research have on science? Should the level of university funding be changed?

Over the past 20 years, more university research funding has come from private sources, such as industry. Does this trend have an effect on the results of university research? Does it affect the overall level of technological progress?

Should the role of government laboratories be expanded?

What role should local governments play (if any) to promote technology?

What role does environmental policy play in encouraging the development of new technologies?

Should the government finance research on alternative energy resources? On fuel cells for cars?

Should the government encourage more joint research ventures, or are the dangers of decreased competition too significant?

What role can technology transfer play in helping to alleviate climate change?

What role, if any, should the government play in providing Internet access to citizens?

Should U.S. technology change in response to pressures from globalization?