

**Take Home Exam #2**

**DUE AT THE BEGINNING OF CLASS ON MONDAY, APRIL 7**

Answer *each* of the following two questions. The goal of each essay is to see how well you are able to apply the tools discussed in class to a real-life situation. For each question, your answer should clearly state the relevant economic theory and how it relates to the problem at hand. Be sure to address all of the issues raised in each question, and to *explain* your positions.

Finally, take the time to think before you write. Well-thought out, well-written answers will be rewarded. A direct, concise explanation is better than a five-page treatise. In addition, pay attention to the target audience. Some of the questions below ask you to write a memo that provides analysis for someone with limited economics expertise. Such memos should be written in a professional manner. The assignments page of the class web site provides a link to an article with suggestions for effective professional writing. For each question, I have provided guidelines as to the appropriate length for each answer (single-spaced answers are acceptable, although not necessary). Choose the level of detail needed to fit your answer within the guideline. I am not just looking for how much you know, but how well you are able to communicate what you do know, which includes filtering through information to highlight the most relevant points.

***The exams are due AT THE BEGINNING OF CLASS on MONDAY, APRIL 7. Late exams give you an unfair advantage over other students in the class. As a result, late exams will be marked down one grade for each day late, starting AT THE BEGINNING OF CLASS on MONDAY, APRIL 7. If you will not be in class on Monday, it is your responsibility to get the exam to me BEFORE CLASS. Do not just leave the exam in my mailbox, as I need to know when you hand the exam in. There is a sign-in sheet at the front desk of CPR for this purpose.***

As you work on your answers, you are permitted to consult written sources, including the lecture notes and textbook. However, the final product should be your own work. As a result, you should not discuss the exam with other students in the class until the exams have been handed in on Monday. Information taken from lecture notes or class readings does not need to be cited unless quoted directly. However, you should cite any other outside materials used.

**And now, the questions...**

## I. Who pays for publication? (2-4 pages)

The world of scientific publishing provides an example of where scientific motives and profit motives collide. The high price of scientific journals raises questions about access to cutting edge scientific research. Academic publishers do not pay researchers for their articles, yet generate large profits bundling this research into journals that are often sold with high subscription fees. The largest academic publisher, Elsevier, generated \$3.2 billion in revenues in 2012 and had a profit margin of 38%. Its leading competitor, Springer, had a 36% profit margin on \$1.1 billion in 2011.

Not all scientific publishers aim to make profits. Journals are also published by a range of non-profit presses, often run through universities. MIT Press and the University of Chicago Press are prominent examples. Journal prices through non-profit publishers are often 50% or more lower than similar journals published by for-profit organizations.

Recently, a number of open-access publishers have also joined the market. Rather than charge readers, these publishers charge authors publication fees and then make the published papers freely available on-line. Some open access publishers are run for profit. These journals often have high acceptance rates – nearly 80-90%, compared to 10-20% at the most selective traditional academic journals. Other open access journals are run by non-profit organizations, such as Britain's Wellcome Trust and Germany's Max Planck Society.

Concerned that high journal prices limit the distribution of publicly funded research, some government agencies have created new rules for publishing research that they support. Research Councils UK, the government organization funding scientific research in the United Kingdom, now requires articles based on studies they fund to be published in journals that make them freely available within one year of publication. In many cases, for profit journals now make special arrangement for such articles to make them available, so this does not necessarily mean that such articles must be published in journals entirely devoted to open access.

However, it does raise questions about who will pay the costs of publication. Even if articles are provided to readers freely, someone must pay the costs necessary to support publication. This includes distributing articles to peer reviewers (who typically work as volunteers), copyediting, and setting up the journal. *Nature* estimates that its costs per published paper are around \$40,000. If journals are not able to recoup these costs through subscription fees, either other sources of revenue or a new publication model will be needed.

Adding to the challenges, a recent experiment published in *Science* in 2013 calls into question the quality of open access publications. In this experiment, a Harvard biologist wrote a fictitious scientific paper. The paper used made up data, and purposely included flaws in the experimental design and interpretation of results. Using a fake name and a made-up academic institution, he submitted the paper to 304 peer-reviewed open-access journals. Of these, 157 found the paper acceptable. Only 98 rejected the paper outright, with another 49 failing to respond before the analysis published in *Science*. Fortunately, the most prominent open access journals, such as those published by the Public Library of Science, did not accept the

article. Nonetheless, open access journals make money through fees charged to authors of accepted papers. Thus, incentives to properly screen for quality research may conflict with the need for open access journals to raise money.

This question asks you to consider the challenges of academic publishing. Are government agencies right to be concerned over the high cost of access to published articles? Does mandating open access publication of publicly funded science make sense? As more governments consider such policies, discuss how the publication process can continue to be supported if the subscription model becomes unable to finance academic publishing. What affects might this have on both the performance and distribution of basic science?

## **II. Technology Transfer in Europe (3-5 pages)**

Successful technology transfer from universities to the private sector has been an important policy area in recent years. Because of the perceived success of the Bayh-Dole Act, many other nations have enacted laws making it easier for public research organizations (PRO) to patent and license the results of their research. PROs include public universities and public science laboratories, such as the Centre National de la Recherche Scientifique (CNRS) in France or the Max Planck Society in Germany. These laws also affect private universities doing research with public funds.

In Europe, policies regarding patenting for PROs have been enacted on a country-by-country basis. Some countries, such as Austria, Denmark, Germany, and Norway, give PROs the rights to patent research results created with public funding. Other countries changed employment rules for public sector employees to clarify that their institutions, rather than the individual researcher, hold the rights to any patentable research resulting from their work. In both cases, the hope is that institutions provide more certainty and lower transaction costs to firms interested in negotiating licensing agreements. Still other countries made additional legal changes, such as France's decision to allow PRO researchers to participate in start-up ventures without losing civil servant status, while not explicitly addressing PRO patents.

Because of the variations in patent laws affecting PROs in Europe, some European Union members advocate a single E.U. policy on patenting and licensing for PROs in the E.U. Among other things, advocates hope that a unified policy would make international collaborations easier. You have been asked by the European Commission to prepare a memo discussing the strengths and weaknesses of such a plan. Given the variation in public sector research organizations across Europe, does a unified plan make sense? Will it facilitate international collaborations? Is such a policy goal worthwhile?

Finally, you should consider the potential impacts of patenting from PROs. What lessons can be learned from the U.S. experience that could help the E.U. design an appropriate patent policy for public sector institutions? Finally, based on the U.S. experience with Bayh-Dole, would you recommend that the E.U. pursue similar legislation? If so, would you recommend any changes to the legislation based on lessons from the U.S. experience? Your memo will be read by officials with little economic training, so the memo should address these issues in clear, intuitive language that is understandable by non-economists.