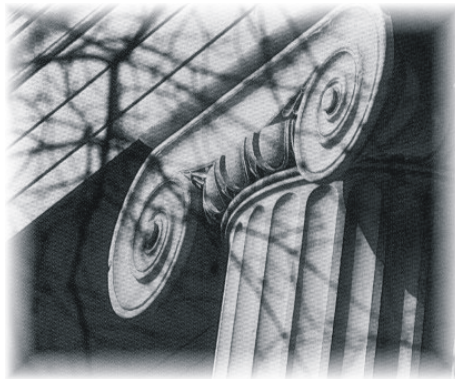


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## **A Game-Theoretic Model of Plagiarism**

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# A Game-Theoretic Model of Plagiarism\*

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**Abstract:** We show that it is rational for individuals in the economics profession to engage in academic plagiarism given current incentives. We also discuss the harm that such actions cause to the original author and to the profession as a whole.

**JEL:** K3

**Keywords:** Ethics, copyright

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## Introduction

What keeps economists from plagiarizing the works of others? Part of the answer is that we are professionals who take pride in our work. Also, we believe that the penalties of such actions are far greater than the benefits if we are caught. Consequently, we believe that our reputations would suffer irreparable damage if it were known that we had plagiarized. There is also the fear of dismissal from our employing institution for such behavior. But are the penalties that great? Before any penalty can be assessed there has to be agreement that the act constituted plagiarism. Research by Enders and Hoover (2004a, 2004b) reveal that the profession does not have a clearly defined notion of what does and does not constitute plagiarism. It is also not clear what body would be willing to make such a call. Should decisions come from the American Economic Association (AEA), journals, or employing institutions? None of these issues have been adequately addressed.

In a recent set of articles in the *Chronicle of Higher Education*, it was revealed that many cases of clear-cut plagiarism that get reported in academia go unexposed or unpunished.<sup>1</sup> If a potential plagiarist's greatest fear is being found out and having a damaged reputation what does it say that so few of these cases are ever resolved and the offender punished? It could be argued that the punishment that most perceive to be in place actually does not exist.

We build a simple model that shows plagiarism can occur even if the original author is made aware of the offense and takes action against the plagiarist. We also discuss the implications that these actions have on the profession as a whole and to the end users of the research.

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<sup>1</sup> See *Chronicle of Higher Education*. 17 December 2004.

## Model

In this simple model there are two players. See Figure 1. The first mover in the game is the Author who is the originator of the idea or genesis of the paper. The second mover in the game is the Plagiarist.

The Author has two actions available to her. She can choose to create a new paper for publication or not. If the Author chooses not to create the paper the payoffs for both her and the Plagiarist would be 0.

Enders and Hoover (2004b) show that authors typically take two paths to protecting themselves from being plagiarized. Some authors will choose to establish ownership by dispersing the paper broadly through electronic working paper series, sending out multiple copies to others in their area, presenting at conferences and handing out copies, and other means. Other authors do the opposite by never handing out copies of the paper or posting them where they can be seen by others before publication. As Enders and Hoover (2004b) reveal, neither method keeps a paper from being plagiarized. One cost of keeping papers secret until publication are lags in citations. Ellison (2002a, 2002b) show that publication lags have increased dramatically. The longer it takes for a given paper to be read by other researchers and to be incorporated into ongoing research and then published itself could cost in terms of citations and delay initiating other strands of research.

Regardless of dispersion method, if the paper is seen by the Plagiarist there are two options available to him. He can choose not to plagiarize or he can plagiarize the work. If he does not plagiarize then the payoff to the Author will be  $P-E$  where  $P$  is the benefit that she would gain from an additional publication. There are several benefits

both pecuniary and non pecuniary that come from having additional publications such as promotion, increased salary, and prestige and recognition in the profession. Here  $E$  is the expenditure of effort in terms of time and energy necessary to create an original work. We conclude that the payoff to the Plagiarist will be  $\gamma$  which is less than or equal to zero. By not plagiarizing, the least severe payoff to the Plagiarist will be no different than if the paper had not been written. However, if the Plagiarist is in danger of not being granted tenure or missing out on other the benefits of publication, the payoffs could be more severe.

As Figure 1 illustrates, there are options available to the Author in the event that she is made aware of the Plagiarist's actions. Enders and Hoover (2004a) show that there is a substantially high probability that plagiarism will be detected by someone. The Author can choose to contest the validity of the offending work or not to fight it.

There are several reasons that the Author might choose not to contest the plagiarized paper even though she has full knowledge that it originated from her work(s). Authors choose not to fight because it is not clear that fighting will be successful. Unlike copyright infringement which hinges on the non accredited use of words, plagiarism is more subtle in that it revolves around the non accredited use of ideas or themes which is more difficult to prove ownership of. In addition, Enders and Hoover (2004a) and List et al. (2001) show that a good deal of plagiarism is of the hierarchical nature where the author is a subordinate of the plagiarist such as a graduate student or a junior colleague.

If the Author chooses not to fight then her payoff will be  $P - E - \delta$  where  $\delta$  is the loss of citations that might be unfairly attributed to the Plagiarist. Or  $\delta$  could be the mental discomfort of knowing that effort  $E$  was shared with the Plagiarist without

permission. For the Plagiarist, if the Author chooses not to contest the paper then his payoff will be  $P - e$ . Where  $P$  is a publication. We assume that the amount of effort necessary to plagiarize a work is less than that to create an original work therefore his effort is denoted as  $e$ , where  $e < E$ .

The Author could choose to contest the work of the Plagiarist. If this occurs the Author would receive payoff  $P - E - F - \rho\delta$ . In this case the Author still gets the benefits of the original paper less the efforts necessary to produce it. However, there is also the cost,  $F$ , which is the cost to fight the Plagiarist. This cost could be opportunity costs of lost time that will be required to make an appeal to a sanctioning body. These costs could include the cost to retain council in the event that legal actions are taken by either party. It is highly unlikely that these costs will be recovered regardless of outcome.

The term  $\rho\delta$  is meant to capture the fact that success in a fight is not guaranteed. In this case  $\rho$  is the probability of failure. Where  $0 < \rho < 1$ .

For the Plagiarist, the payoff associated with a fight would be  $(1-\rho)(D-d) + \rho(P - e - d)$  where  $D$  is the punishment associated with being found to have plagiarized. This punishment can range from dismissal from the employing institution to nothing at all. The term  $d$  captures the cost of defense against charges of plagiarism.

### **Solution**

We begin to solve this game by determining whether the Author would fight against the Plagiarist. The Author considers:

$$P - E - \delta > P - E - F - \rho\delta \quad (1)$$

Which would imply that the Author chooses not to fight when:

$$\delta(1 - \rho) < F \quad (2)$$

Equation (2) states that if the costs of fighting the Plagiarist are greater than the expected gains from victory then the Author is better off not fighting. What must be considered is what gain the Author actually receives from a successful fight with the Plagiarist. At best, a victory will make the Author no better off than she was before the encounter since there are no additional considerations for the original publication. Even if victory were assured, meaning that  $\rho = 0$ , it would still be best not to fight if fight costs are non negligible. In the event that  $\rho = 1$ , any non negative fight costs would mean that fighting would not be a worthwhile pursuit.

Given that the Author is not going to fight, the Plagiarist considers:

$$\gamma < P - e \quad (3)$$

Since the greatest value of  $\gamma$  is zero, the Plagiarist will plagiarize as long as  $e$  is less than  $P$ . This must be the case since  $e < E$ , and the Author would not have written the paper unless  $P > E$ .

The Author's choice is:

$$0 < P - E - \delta \quad (4)$$

which implies that as long as the benefits of publication outweigh the energy of creating a paper along with the knowledge that the paper *can* be plagiarized, the Author will create the work. In this model there will be papers produced and there will be some degree of plagiarism.

### **Implications**

This scenario is a textbook example of a negative externality. The Plagiarist is not intending to cause harm to the Author. In fact, the Plagiarist would prefer that the Author not know that plagiarism occurred.

However, the damages caused by plagiarism are not limited to the Author. The profession as a whole is damaged by these actions. If the profession hopes to increase the well-being of others and influence policy makers regarding areas that are impacted by economic modeling it would be distressing to learn that the work is not original. If the general public or policy makers lose faith in the validity of economic research the profession loses. It is not clear whether the threat of being plagiarized would lead authors to only disseminate published papers however, our profession hinges on the exchange of ideas and the entire profession is hindered by anything that slows or thwarts that exchange.

Arce (2005) shows the impacts of “corporate culture” on unethical behavior. The author shows that what this paper describes as fight costs are real and substantive so it may be not worth it to the Author to contest the plagiarized work. Research has shown that economists take a grim view of plagiarism but this is not supported by the “corporate environment” in that there is no governing body that is willing to hear cases of alleged unethical behavior.

It is clear that there is an over production of plagiarized papers. However, there seems to be hesitancy to use any of the ideas that are taught in economics classes to decrease it. The profession could have a sanctioning body designed to hear cases of alleged plagiarism. Technology is such that there are many software programs designed to detect works with similar themes. This type of technology should be freely available to all journals. These measures are not currently in place.

As mentioned in Enders and Hoover (2004a) a code of ethics could be helpful. Finally, as mentioned in Arce (2005), the culture of the profession needs to be changed so

that subordinates are not hesitant to bring charges against superiors because of possible retaliation.

## **Conclusions**

We show that plagiarism is possible in the profession even if the original author is willing to contest the work of an alleged plagiarist. We also show that the production of plagiarized papers can be reduced by using principles of economics such as reducing the costs to those that contest suspicious work or by altering the environment by reducing the expected back lash that can occur when a superior is accused by a subordinate.

By taking measures to reduce the amount of plagiarized work in the profession, we strengthen our relationship with the end users of our research such as policy makers, the general public, and other economists and social scientists.

## **References**

- Arce, D. M., 2005, The Whistle Blower: Hero or Rat? Rhodes College Working Paper.
- Enders, W. and G. A. Hoover, 2004, Whose Line is it?: Plagiarism in Economics. *Journal of Economic Literature* 42(3), 487-493.
- , 2004, Plagiarism in Economics: A Problem Needing Attention!? University of Alabama Working Paper.
- Ellison, G. 2002 The Slowdown of the Economics Publishing Process. *Journal of Political Economy* 110(5), 947 – 993.
- 2002 Evolving Standards for Academic Publishing: A q-r Theory. *Journal of Political Economy* 110(5), 994 – 1034.
- List, J., C. B. Bailey, P. Euzent, and T. Martin. 2001, Academic Economists Behaving Badly? A Survey on Three Areas of Unethical Behavior. *Economic Inquiry* 39(1), 162 – 170.

Figure 1

