

Examining the Economic Effect of Various Forms of Pharmaceutical Intellectual Property

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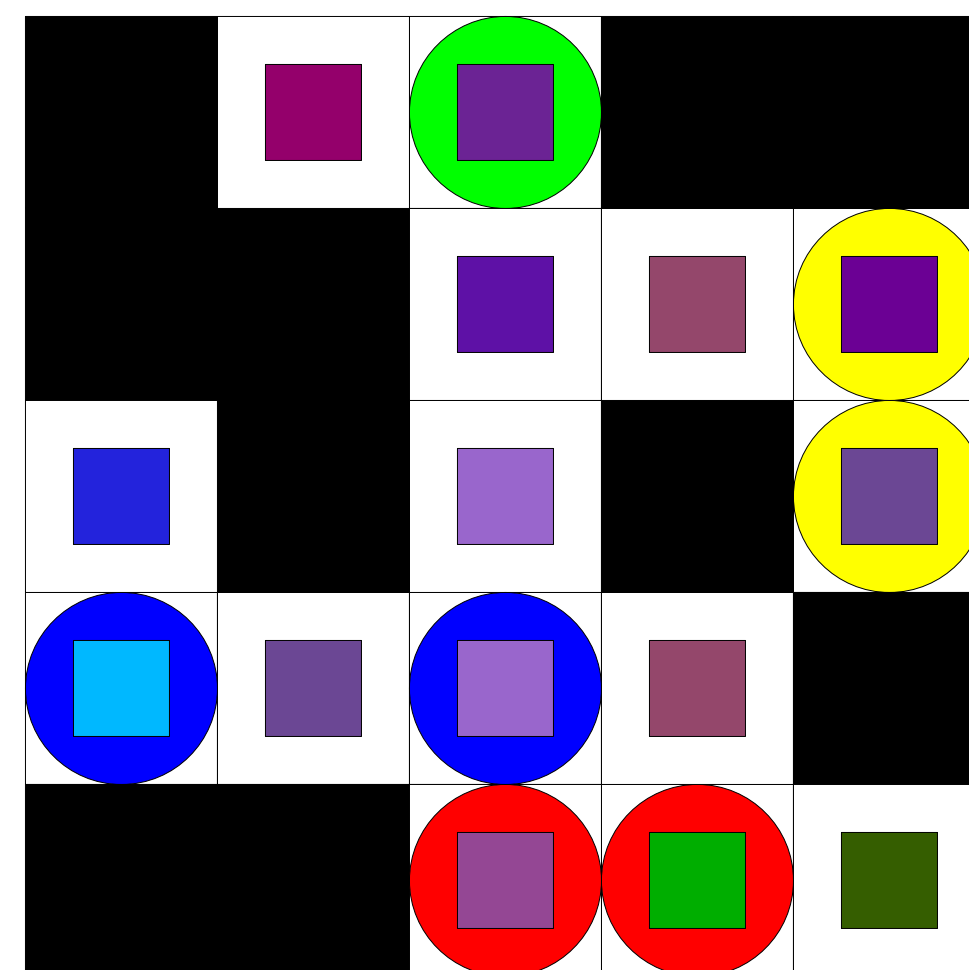
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Abstract

The project attempts to examine the effects of intellectual property systems on the pharmaceutical industry from an economic standpoint. The goal is to discover what forms of intellectual property are the most effective economically. This topic is a major issue today since the intellectual property laws of the United States are a contentious issue, especially in relation to the violation of these laws by pharmaceutical companies in developing nations. Despite the widespread discussion of this issue from sociological, medical, business, and political standpoints, almost no research with an economic focus exists. Moreover, Sugarscape provides a unique system for testing the economic viability of various property laws, due to its decentralized nature and ability to simulate many of the influential factors using real-world data. Thus, this project attempts to judge the current United States pharmaceutical intellectual property situation from an economic standpoint and evaluate potential reforms to the intellectual property system.

Background

Intellectual Property laws have generated significant controversy. One particular component of this is the pharmaceutical intellectual property laws of the United States. These laws allow US drug companies to patent new drugs and prevent competitors from making their patented drugs. Because of this, they are able to sell their drugs at a high price because of the lack of competition. This has caused an outcry from human rights activists and Third World countries who claim that this prevents the poor from getting the medication that they need to survive. Because of this, many developing nations have chosen to ignore US intellectual property laws, allowing local companies to produce patented drugs and sell them for a fraction of the price. This has enraged the pharmaceutical companies, who allege that this is a theft of their property and that they cannot afford to lower the price because of the expense associated with creating new drugs. All the research on this issue has been done from a sociological or business standpoint. Very little research has been done by economists - so far they have mostly contributed with more informal arguments. This project attempts to fill this gap by analyzing the US intellectual property laws and possible reforms to the those laws from an individual-focused economic perspective.



Methodology

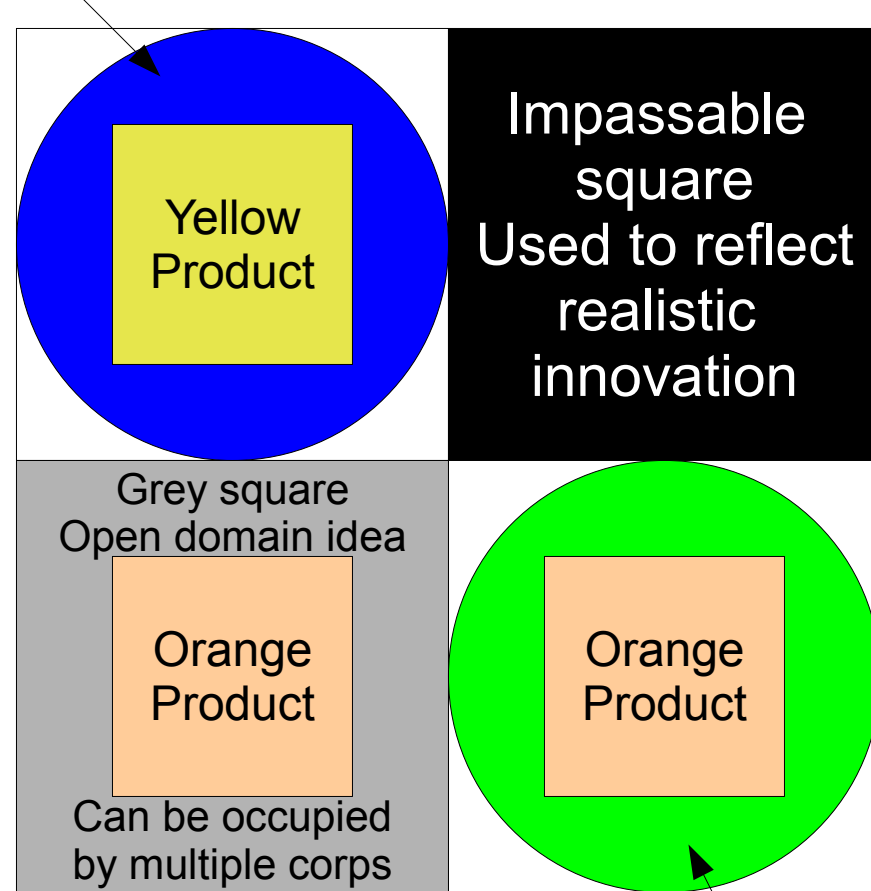
This project uses a modified version of Sugarscape in MASON. In this system, agents exist on a grid of locations. Each location is a separate pharmaceutical idea for a drug. Each idea can produce a certain product, and ideas are grouped together based on their product. Ideas can also be patented, so only the original discoverer can use it. The length of the patent, the costs of it, and the initial investment necessary will all be changed in order to measure different IP laws. Many ideas are left black - they cannot be used in any way. This is to represent the more linear structure of innovation, as sometimes additional ideas depend on the ones before it.

Products exist in a supply and demand market for that product. The price and consumption of the product is determined by market forces. This data is influenced with real world data, which determines the innate supply and demand for products from each idea. In addition, the real world data is used to simulate a degree of market irrationality and boom-bust cycles.

Agents occupy ideas in order to produce products. These products are bought and sold with sugar, the wealth of this world. Agents can manage a product using their metabolism, which represents their efficiency at producing the idea. In addition, they can see surrounding squares, and if they find it advantageous, expend sugar in order to move to another square. Their vision also helps them determine whether moving would be profitable; lower vision makes their estimates less accurate. They seek to gather the most sugar possible through making a profit on their products.

Corporations loosely control these agents. They hire and fire them through an agent job market and manage the agents' patents. They maintain legal teams which can be used when agents try to move into a square patented by another company. This results in a lawsuit, a match up between the two legal teams. They take a stipend from their agents and help provide investments. They try to gather the most sugar possible.

Agent from Blue Corporation



Pharmaceutical idea

Agent from Green Corporation

Testing

To test this, agent and corporation stats will be randomized with some modifiers from real world data. Products and ideas will undergo a similar process with black squares being placed to reflect the ideas. American intellectual property laws will be tested, as will others with changes in ideas properties to reflect this. To determine the economic viability, the amount of demand satisfied for each will be tested, as will presence of monopolies in product markets.

Results

The project was unable to complete the implementation of real world data in the allotted time. However, the project did result in an effective economic simulation. This simulation could be used for a variety of topics, especially other forms of intellectual property. This result will allow other efforts to build on this program to examine more complex and specific situations.