



Jinchen (Felix) Zhao

Applied Math, Physics, Machine Learning

Jinchen Zhao is an Applied-Math major sophomore at Duke Kunshan University. He is interested in math and physics, so he is now working as a research assistant in the Collective Dynamics Lab. He has a great passion for Mathematical and Physical models because he appreciates the way scientists understand and predict the world using math and equations.

In his free time, he likes to use the spare money to make some investments. He gets to learn many economic principles, including sunk cost and marginal benefit, which can help him make decisions more effectively. Therefore, he is curious about how economics works and how production, consumption, saving, and investment interact. He also develops his interest in machine learning in course STATS102 and wonders how to apply machine learning in economics and finance.

Undergraduate Class of 2023 | Duke Kunshan University
Collective Dynamics Lab | Duke Kunshan University

Email: jinchen.zhao@dukekunshan.edu.cn
LinkedIn: www.linkedin.com/in/jinchenzhao

Marginal Change In Real Life



Jinchen Zhao

Marginal change refers to the influence of getting more of a product. It is a vital part of economics because it helps to provide people a measurement of costs and benefits while making decisions. For example, I am a tall person. When I travel by high-speed rail, second-room seats could be uncomfortable for me. Therefore, I have to decide if the marginal cost of paying more for a seat with more legroom is worth the benefit of getting the additional legroom. When I travel from my home (Nanjing) to Kunshan, I usually think the legroom's marginal cost outweighs the marginal benefit, but I will choose to upgrade my seats on long travels.

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light green. They are positioned diagonally, with the blue one partially covering the green one.

How Market Works

Round Table Conversations



Author: Jinchao Zhao
Contributor 1: Ziang Zhou
Contributor 2: Meiyi Guo
Contributor 3: Jiaheng Zhang



Summary

The COVID-19 pandemic has had a substantial impact on the film market in 2020. Cinemas and movie theaters have been closed across the world, and film releases have been moved to future dates. This round table conversation aims to find out the origin of various outside shocks of the economy and how they lead to the change in demand and supply. Based on the change in demand and supply in this period, we will further analyze the equilibrium price change. Finally, we validate our opinions by comparing our analysis with the real market and taking several movies as examples. We conclude that the COVID-19 pandemic has led to many profound outside shocks for the film market, influencing the quantity of demand and supply, and finally determining the equilibrium price.



Conversations: Outside Shock

Ziang Zhou: During the pandemic, countries in hot-spots have closed or restricted cinemas and movie theaters, negatively affecting film revenue. Attendance has also been lower in other regions. Following the pandemic in mainland China, almost all the cinemas were closed in January 2020. Due to the pandemic, many famous movies are postponed, which can also become an incentive for people.

Jinchen Zhao: As the pandemic is eased in China, more and more movie theaters are set to reopen. Most of the country is now classified as low risk, so it is expected to be essentially a nationwide reopening of the movie market.

Meiyi Guo: Many Hollywood films were set to hit Chinese cinemas to attract post-COVID crowds. They included a 3D, 4K restoration of “Harry Potter and the Sorcerer’s Stone,” as well as “1917” and “Little Women,” which both began putting out new promotional material in May, apparently in anticipation of a theatrical run.

Jiaheng Zhang: Most people are staying at home during the pandemic and students are on holiday, which means that people have a lot of free time for entertainment. After the quarantine, most people are eager to go outdoor and have fun.



Conversations: Supply and Demand Change

Jinchen Zhao: I remember that at the beginning of the reopening, many cinemas underestimated people's willingness to watch movies, so the price of a movie ticket was very low at that time. This indicates a right shift of the supply curve, as firms are willing to sell the tickets at a lower price.

Jiaheng Zhang: In the short term, the number of reopened cinemas is limited, which means supply is limited. However, the demand of people keeps growing, so the demand curve shifts right.

Ziang Zhou: In the long run, more cinemas are going to reopen. Thus the supply grows and the supply curve shifts to the right.

Meiyi Guo: As people get back to work, they are going to have less leisure time. Consequently, the demand will decrease and the demand curve will shift to the left.



Conversations: Equilibrium Price and Quantity Change

Ziang Zhou: When the cinemas underestimated people's willingness to watch movies, they tend to sell tickets at a lower price. The supply curve shifts right and the equilibrium price decrease. In many cinemas, we could see a ticket of less than twenty yuan at that time.

Jinchen Zhao: As the pandemic situation gets eased, more and more people want to watch movies. The demand curve shifts right and the equilibrium price increase. One ticket for "Harry Potter and the Sorcerer's Stone" even rose to 130 yuan.

Meiyi Guo: In the long run, more and more cinemas are going to reopen. Therefore, the supply curve will shift right, resulting in a decrease in equilibrium price.

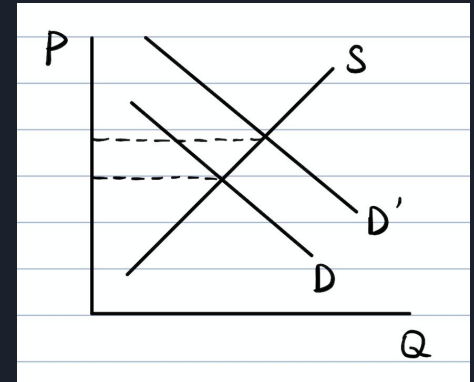
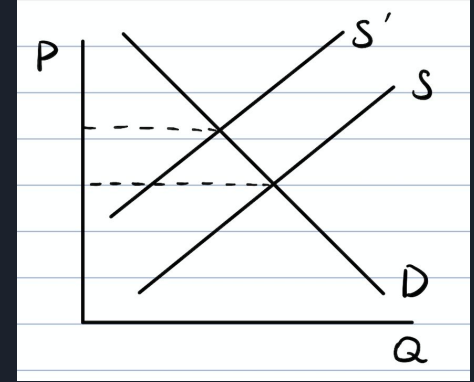
Jiaheng Zhang: As more and more people get back to work, they will have less leisure time. Consequently, the demand curve will shift left, also leading to a decrease in equilibrium price.

Conversations: Consumer Surplus, Producer Surplus and Total Surplus

Due to the closure of the cinemas, there was no movie market. The consumer surplus and producer surplus are both zero. Hence the total surplus is also zero.

When the government decides to reopen the movie industry, the supply curve shifts to the left because the number of seats provided is limited. The consumer surplus will be smaller than that before the pandemic, while the producer surplus change is undetermined. The total surplus will increase.

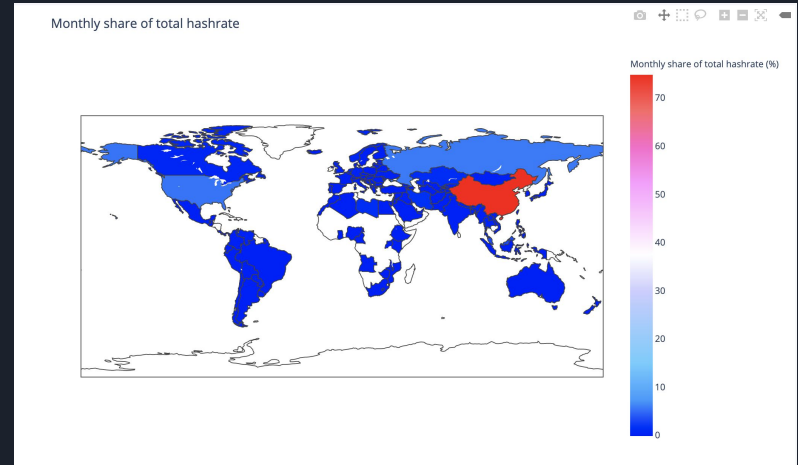
As the situation gets better, more and more people need entertainment, indicating the demand curve will shift right. The producer surplus will increase while the change in consumer surplus is undetermined. The total surplus will increase.



Interactive Plot of Hash Rate

According to Coin Rivet, the hash rate is the speed at which #cryptocurrency mining equipment operates. The stronger the hash rate in the network, the greater its security and overall resistance to attacks. With the help of Dr. Zhang in course ECON 101, I managed to create an interactive plot of the monthly share of hash rates of countries around the world. From the chart, we can see that since 2019, Chinese mining pools have been controlled more than 60% of the Bitcoin network's collective hash rate, indicating China is a great contributor for Bitcoin mining. As the difficulty of mining increases, the cheap electricity in China has become an advantage for Chinese miners to stand out and contribute to network security.

It is great to learn Plotly library in this class, because interactive plots are more visually attractive and are able to show the change of data in time series.



https://www.linkedin.com/posts/jinchenzhao_monthly-share-of-total-hashrate-choropleth-activity-6714898004308033536-YVLv
<https://chart-studio.plotly.com/~FelixZhao/1/#/plot>



My Growth as an Economist

In this course, I get to know many elements in microeconomics and macroeconomics. I am interested in finance, so I usually read some news in the stocks market in the morning, but in the past, it was hard for me to understand the real meaning of some technical words, including cutting interest rates and capacity increase. In the course, I learn the importance of those concepts in microeconomics and macroeconomics, and understand how they interact in the market. Understanding those concepts gives me a more holistic view of how society works.

Some economics concepts also change my way of decision making. In my study and life, I used to focus on past cost rather than future utility. Principles of economics teach me that sunk costs are backward looking decisions, but economists think at margin. I should care more about the benefit and cost of future decisions than decisions I have already made.



Future Economist Perspective

I want to become an economist because I appreciate how economists describe society through math and equations. When I study microeconomics in ECON 101, it is exciting that people's behavior can be described by the supply and demand curve, and the intersection of these two can be interpreted as the equilibrium of society. I know the situation is much more complicated in the real world, and it is not realistic to describe those economic concepts by straight lines. Therefore, I am willing to explore this area further and make my contribution.

If I could win the Nobel Prize, I hope I would be nominated by inventing a new theory in game theory to resolve economic inequality between countries.