



# DARPAN BARUA

Interests: Artificial Intelligence, Data Science, and Economics  
(alphabetically ordered)



Hailing from the metropolis Dhaka in Bangladesh, Darpan Barua is the first representative of his country and is currently in the Freshman Class of 2024 at Duke Kunshan University. Darpan's interests are largely based on Economics. He has also been a part of the first ever Bangladesh Team at the International Economics Olympiad 2019 in Saint Petersburg, Russia. The team selection are among thousands and often require candidates to cross multiple rounds. His performance and persistence led him to be selected again for the National Team at the International Economics Olympiad 2020 (which was supposed to be held in Nur-Sultan, Kazakhstan but now will be held online). He has had large interests in Consultancy and Business Cases from the advent of his high-school period.

He has independently ventured into Data Science and is keen to further explore the major. He plans on majoring in Data Science/ Applied Maths and Computational Sciences and complete his graduate studies in Economics/ Finance. He is keen on understanding the implications of Artificial Intelligence into business strategies as well.

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Undergraduate Class of 2024 | Duke Kunshan University

# TRADE CAN MAKE EVERYONE BETTER OFF



Darpan Barua

A simple google search leads to the definition of trade being “the action of buying and selling goods or services”. Often times, it is thought that trade can make everyone better off on an international level only. An economics lecture would teach how comparative and absolute advantage models out among competitive nations. However, like many economic theories, this theory can be seen at play in our day-to-day lives as well.

During my school days at the Science Club or the Model UN, tasks were assigned on the basis of each member’s skills/abilities. If someone was great in negotiations and managing people, he/she would’ve been assigned to head the Public Relations team. Similarly if someone was great in managing finances: Treasurer, working and managing under stressful situations: Operations Team, making eye-catching posters or videos: Media department, being a Social Media Queen/King: Social Media and Marketing Team. Not only were the respective individuals efficient in their tasks but they also enjoyed their work which further incentivised them to devote their time and energy to the programs. This usually led to the deliverance of a well-organised and successful event which was ultimately everybody’s goal.





# How Market Works

Round Table Conversations



Contributor 1: Josh Manto  
Contributor 2: Yun-yu Chen(Arthur Chen)  
Contributor 3: Queena Zhong  
Contributor 4: Giulia de Cristofaro  
Author: Darpan Barua



# Summary

China has the largest market for food delivery in the world with Shanghai, Zhejiang, Guangdong, Jiangsu, and Beijing taking the largest shares. Nearly half of China's internet user base has ordered takeout food through apps at some point in their life. The growth rate for the market is over 10% and is exceeding the growth rate of traditional catering services. Delivery companies like Ele.me and Meituan are leading this charge. (Source: [Daxue Consulting](#))

How is the O2O Food Delivery market's growth being affected by COVID 19? Is it accelerating its growth now that restaurants have to be closed?

Conversations:

- Outside shock - pandemic
- Changes in demand and supply
- Equilibrium Price and Quantity Change



# Conversations: Outside Shock

*Giulia:* “The pandemic suddenly came and no one was prepared.”

*Darpan:* “This shock is more evident in populous provinces like Shanghai, Zhejiang, Guangdong, Jiangsu, and Beijing. These provinces consist of the more working population who are likely to not prepare food themselves. The pandemic forced them to opt for more food delivery services instead of traditional restaurants.” (Reference: [Daxue Consulting](#))

*Arthur:* “Yes! Also, age-wise, the orders are more likely to come from younger people aged 18-39.” (Reference: [Daxue Consulting](#))

*Giulia:* “Following what Darpan said, Meituan (the largest O2O food delivery service in China) registered orders increase from 80% to 95.1% from January 26 to February 8!” (Reference: [BBC](#))

## Summary:

The outside shock (the pandemic) was unprecedented. The impact was more evident in populous provinces where people are more likely to use this service. The traditional restaurants have *suffered* while the O2O food delivery services seem to have *gained*.



# Conversations: Supply and Demand Change

*Josh:* "The customers and industries *adapted* to the context of the *situation*. For example, Meituan adapted to the regulations set by the government. To reduce face-to-face contact, they started leaving customers' food to their doors instead of giving them in person. The stakeholders achieved *contactless service* through cashless payment systems."

*Queena:* "So, the traditional restaurants and the O2O food delivery services could be seen as *substitutes*. Therefore, while the demand for food from traditional restaurants fell, the demand for food delivery services grew by a larger *proportion*."

*Arthur:* "Another angle to look at could be that restaurants who later collaborate with food delivery services, could make more *revenue*. This might also help increase the *supply* in the food delivery services market."

## Summary:

The market for food delivery services and the relevant *stakeholders* adapted to the changes in the situation to facilitate its operations. The *demand* for food delivery services rose but the rise in demand was also met by a rise in *supply* as more traditional restaurants started collaborating with food delivery services.

# Conversations: Equilibrium Price and Quantity Change

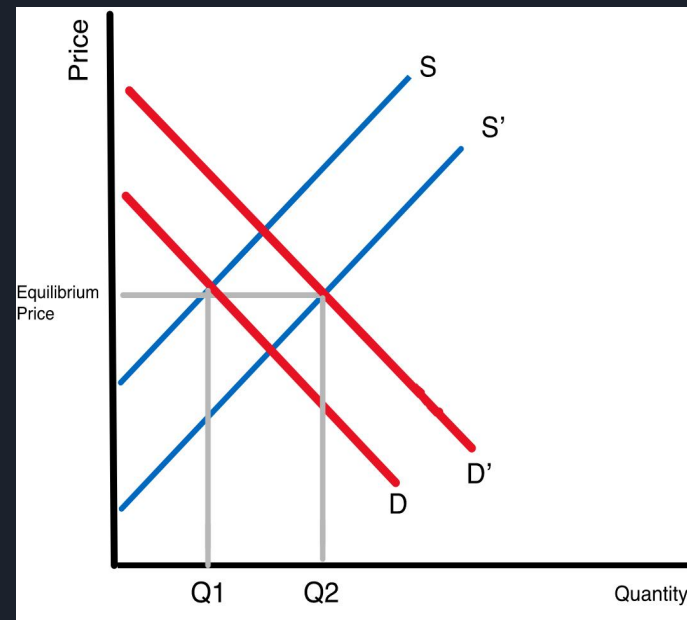
Giulia: “So far we’ve seen that the demand rose when the lockdown hit but the supply also increased as more restaurants collaborated.”

Queena: “The price of food delivery services stayed almost unchanged as the *equilibrium price level* remained unchanged (at least theoretically). The quantity of food delivery services increased, however.

Darpan: “Before 2019, the Online Food delivery industry revenue grew by 20.4% annually. From 2019 to 2020, the industry revenue grew by 28%. Following 2020, the projections show an average increase of 8%. The sharp rise from 2019 to 2020 proves the impact on the industry due to COVID 19.” (Source: [Statista: Online Food Delivery in China](#)).

## Summary:

The equilibrium price remained more or less unchanged while the quantity supplied increased. The illustrative model beside shows this change in the market forces.



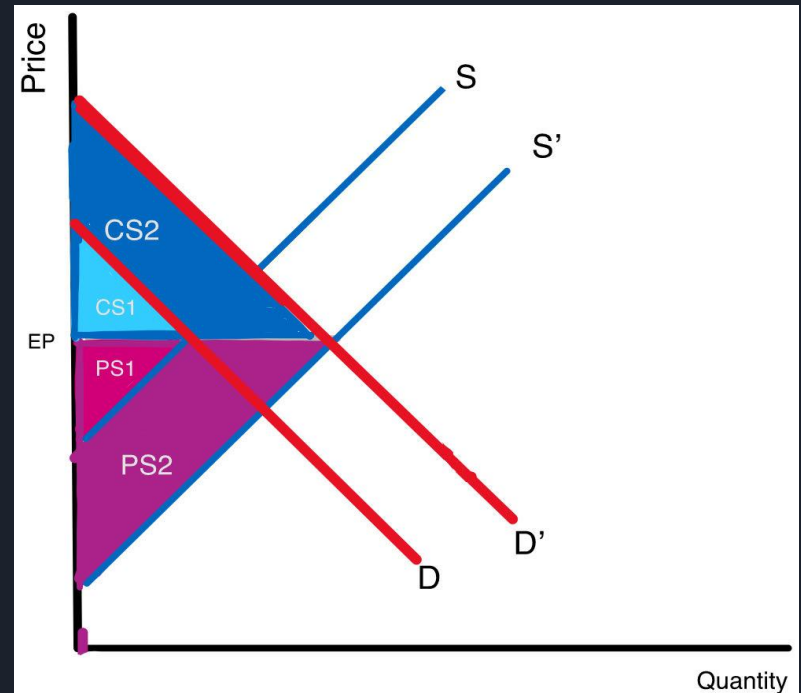


# Effects on Consumer Surplus

The diagram shown here is similar to the market diagram from the previous slide. This illustration however looks in-depth to the Consumer and Producer Supply (CS and PS) Analysis. CS1 and PS1 denotes the consumer surplus and producer surplus in the 'base' or 'initial' market conditions.

As we see the effects of demand and supply take place, both consumer and producer surplus increases to CS2 and PS2 respectively. This is also justified by the increase in the equilibrium quantity as demonstrated in the previous diagram.

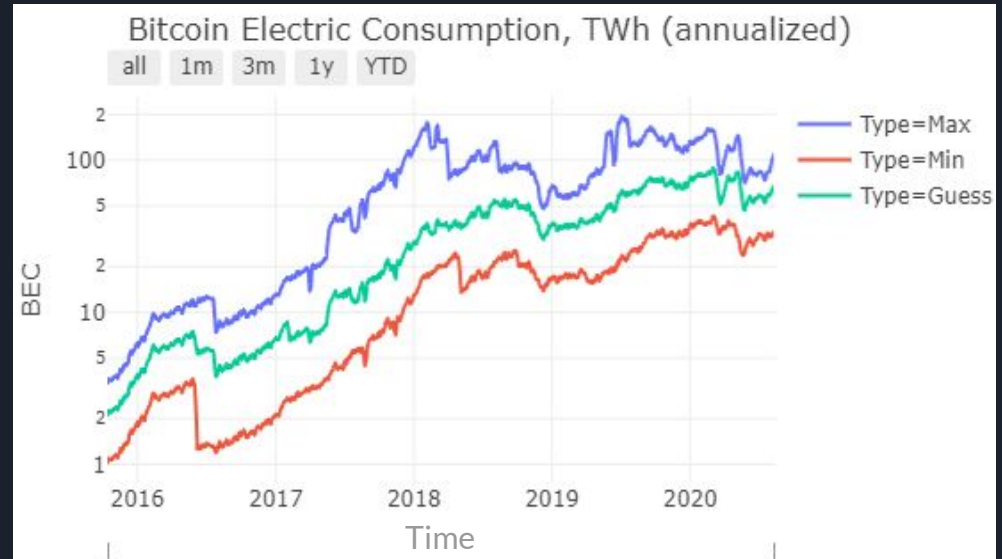
However, since this analysis is based on qualitative assumptions, a quantifiable data cannot be stated thus making it uncertain to determine a comparative analysis between the changes in producer and consumer surplus.



# Can bitcoin's high energy consumption threaten its own usability? : A data-oriented view

The scarce blockchain based bitcoin has to be 'mined' which requires a huge energy consumption as the miners seek results to a kind of algorithmic puzzle that fits a very specific set of requirements. The price of bitcoin has soared to roughly USD\$10,500 in 2020 which is likely to attract more miners. However, despite the advances in mining processors by companies such as IBM, energy consumption is likely to continue to grow higher to meet the higher computing power needs. According to the Plotly chart below, the 'guess' requirement for electric consumption according to recent data stands at a whopping 67 Terra-Watts per hour (which is 1/5th of Britain's energy consumption!). This high energy consumption poses a challenge for its feasibility to be used as a currency.

There's more to dive in to in this field but for now I am grateful to my Economics Professor Luyao Zhang, Ph.D. for her kind guidance with this exploration.



Reference to LinkedIn Post: <https://rb.gy/i7guum>

Reference to Plotly Chart: <https://rb.gy/y5yj27>



## How this course instilled growth in me as an Economist and set a new viewing angle for future decision-making

My expectations from a college-level economics course were more of a - theoretical course design, tiring lectures, and lots of memorization. However, this course changed my perception of even understanding how college works right from day one. The assignments and course-related activities are all aimed at preparing a student for a more competitive and tech-oriented future. The integration of projects such as those on Google Colab and GitHub was something completely unexpected from an “ECON 101 Course”. The professor’s attempts on having the students active on LinkedIn and break away from their comfort zones through group projects and presentations: truly demonstrate how the course is “*not just another course*” but is preparing for life after college as well.

Back to the academics. The course encouraged me to think about Economics from a different viewpoint. I viewed it from a theoretical glass previously but the Professor taught me how to truly “think” like an Economist. While I did learn a lot about Economics, I probably learned more about life in general. We also had prominent guest lecturers like Gary Charness who also emphasized on the thought processes.

Many can be good with numbers and analytics, but not critical and creative thinking. This is something that I believe I improved on and will continue to do so.



# POSSIBILITIES AS A FUTURE ECONOMIST

I believe that at the core, we are all Economists. An engineer constructing a highway roads would have to find the opportunity cost between increasing one lane and the potential traffic ease it would bring or not. One may see a Chemist working on the thermodynamic based microeconomics or finding ways to differentiate their company's cosmetic product to get an edge in the market. It may be a designer who leaves clues or releases designs to keep creating demand in the fashion industry. The possibilities are endless. While I may not be certain about my career path, should I step into the field of research, I would like to embark upon the creation of a software that would help businesses make better decisions. The software would be such that it runs on relevant data provided by the company and runs simulation as per economic theories. This way I would hopefully bring more clarity into Economics and break away from the norm of having to study only "rational" economics in an irrational world.

In the highly and probabilistically unlikely event where I win a Nobel prize, perhaps I would want my Nobel prize to be something unique, short, and easily comprehensible so that my message can reach out to more people.

*"Every year during the Nobel Prize releases, my mother hoped to see me win one. Regardless of the fact whether she found it amusing or not, I laughed at the thought of it. The reality laughs at me now that I have won. I hope my discovery leads to the common good for the society and bring actual changes. My biggest victory today is not the medal but the ability to spread my message to the world effectively. Whoever and wherever you are, no matter your background is, you are capable of being the best. And be fearless: venture into new fields, for you may not know what you might find. Whatever you do, pour your heart into it and yes - do it for yourself. That will fuel you to do something for others. Try to create history and leave your mark because we are just some other organism in this great universe. But do not get too caught up in making history and be hard on yourself. The goal is to enjoy life and make the most of your abilities."*