

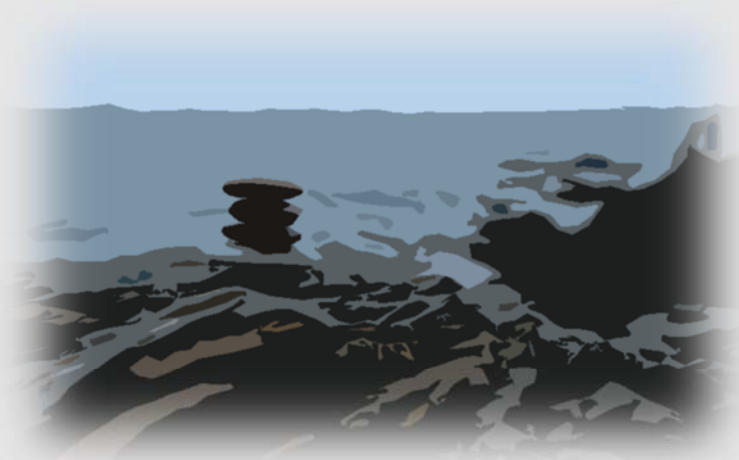
Research Enrichment Program



<http://deaic.org/outreach/>

Balance between Life and Nature

As per the United Nations, the average life expectancy of human beings has increased to 73 years as of 2019. The world population is expected to increase from 7.6 billion to 9.8 billion by 2015. Meanwhile, the rate of resource consumption is 1.7 times higher than the renewal rate of the Earth. It is also estimated that 3 similar planets would be required by 2060 to supply and deliver human needs. The population is not only growing, but also more mobile. Every year, a



tremendous number of people are relocating – moving from one country to another. What are the effects of global migration on life expectancy? What are the impacts of population growth on food production? How does population growth affect agriculture, dead zones in the oceans, and urbanization? And what would be the impact of population growth on education, economics, diversity, and social life? The many questions boil down to the quintessence of finding a balance between population growth and resources to achieve the perfect harmony between the human and the nature.

Hunger Index

Do you know that in 2018, there were about 821 million hungry and undernourished people in the world? According to the United Nations report, one in nine people in the world do not have access to enough food supplies and nutrients to maintain the healthy functioning of an active life. Hunger and malnutrition are some of the biggest risks to worldwide health, posting greater threats than AIDS, malaria and tuberculosis combined. In many countries with economic slowdowns, food deficiency has increased significantly. The same scenario is currently going on in countries and regions impacted by the COVID-19 pandemic, mostly in middle-income and lower-income regions. It is saddening to fathom that one in nine people go to bed with an empty stomach every night, and one in three suffer from malnutrition at least to some extent. How do we build a Hunger Index to measure the sustainable development of nations? Which countries are most at risk for food insecurity? These are some important research questions one may want to think about.



Globalization

You may have heard of the word globalization numerous times in your life. Globalization is a ubiquitous topic in the business world that never seems to be outdated. It has impacted people all around the world, contributed to sustainable development, and led to positive economic and societal changes. Globalization stimulates the economy by creating more opportunities for cooperation and interdependence between different countries, helping the world GDP grow from around 50 trillion USD in 2000 to 75 trillion USD in 2016, according to United Nations. However, with opportunity comes responsibility. Globalization also brings the world with new challenges, such as the heterogeneity in wealth distribution. How do we evaluate the extent and



impact of globalization, and how do we control for and alleviate the potential negativities brought by globalization? The answers to these questions may reshape and revolutionize the future of globalization.

Aftermath of COVID-19

Recently, the Organization for Economic Co-operation and Development (OECD) reported that the COVID-19 pandemic has "triggered the most severe economic recession in nearly a century". Indeed, countries are striving to find remedies for this economic impact, taking measures to mitigate the damage on economics, industries, public health and social well-beings. Millions

of people are struggling with finding stable and reliable supplies of PPE, let alone the higher unemployment rate. The Federal USA government has issued a \$3 trillion Coronavirus stimulus bill to support the US economy. However, more than one third of American workers are now unemployed. Coronavirus is not the first

pandemic that has severely affected mankind in history. From 1346 to 1353, the Black Death swept through Europe and took 75 to 200 million lives. The Spanish Flu from 1918 to 1920 caused 50 million deaths, and AIDS has taken 36 million deaths since 1981. The COVID-19 pandemic to date has caused about 450 thousand people to lose their lives and affected more than 8 million people around the globe. Were we ready for the COVID-19 pandemic? What can we do to help education, transportation and economics to thrive again? How can industries be more prepared for possible outbreaks in the future?



Global Warming

Global warming is becoming a major concern of industries and academia form all over the world. The global temperature has been subtly, but gradually rising over the past several decades. In fact, the last decade was the warmest decade since 1850, and sixteen



out of seventeen hottest years in recorded history occurred in the last two decades. According to the world meteorological organization (WMO), the world was 1.1 centigrade warmer in 2019, compared to that in the pre-industrial period. One of the most direct and impactful damages of global warming is the rising sea levels. Since 1980, the average sea level has increased the average sea level has increased by 9 inches, at a speed of 3.4 mm per year, on average. This impact is both biologically and environmentally detrimental. Studies report that human activities and carbon emissions are the two primary causes of increased sustained temperature. What is the effect of global warming on forests? How about living creatures and water resources? Is

global warming related to human diseases?

Financial Risk

Are you risk-averse or a risk seeker? Your spending and saving habits may tell a lot about your risk preference. Risk is pervasive in the banking industry, including both commercial and investment banking. It is an important factor in making rational and responsible financial decisions. The purpose of measuring risk is to be able to manage it



and help people achieve more optimized decision making. Risk has a great impact on the performance of banks, you may have heard of “higher risk yields higher return” and “techniques to mitigate banking risks”, because there is not just one type of risk. For this project, you will have the opportunity to build a framework to incorporate different kinds of risk into the evaluation of bank performances. Using a data set of international banks, you will

identify some financial indicators of risks and bank profitability that can be used in the model, think about how to integrate them to construct a risk index, evaluate the risk-adjusted performance of these international banks, and look for determinants or sources of poor bank performance.

Sustainable Global Energy Consumption

The global demand for electricity consumption is rising. In developed countries, this increase is even more prominent. This is due to the growths in population and economy. But what are the major sources of electricity? According to the US Energy Information Administration (EIA), nearly ten percent of the world's electricity is produced by nuclear



power. Coal power supplies twenty two percent of electricity of all Organization for Economic Co-operation and Development (OECD) countries. The total per capita electricity consumption has been affected by outsourcing energy. It is expected that the global consumption of fossil fuel will decrease and the prevalence of renewable resources of energy will be expanded, according to the Paris Agreement. At the same time, energy companies are trying their best to increase production capacity so that they will be able to provide sufficient

energy to meet the global needs by 2050. How do we balance the demand for utility with operations and resources? How can energy suppliers improve production efficiency safely and responsibly?