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Mathematics: The Key to Economics

Every day in the world, people participate in hobbies and responsibilities including grocery shopping, listening to music, determining what fits the budget (by calculating finances such as taxes), and a myriad of others. Whenever a person performs these tasks, mathematics is somehow involved, sometimes without even thinking about it. For example, return to the idea of grocery shopping. When shopping for groceries, one may ask himself: what should be purchased, for whom should it be purchased, and how much should be purchased? As seen in this case, these questions provide the three key concepts of economics, where mathematics is functional and essential; numbers referring to cost and the availability of resources answer the three key concepts of economics. In general, mathematics has evolved in a progressing world: people apply mathematics to innovative technology, unique business methods, and new marketing and informational systems. Such technologies, methods, and systems are vital to boosting a country's standard of living. To improve the standard of living, especially here in the United States, people must perceive how mathematics is crucial to understanding economics.

Before transitioning to the idea that mathematics is essential to understanding the economy, one may argue that mathematics may have crossed its boundaries: people have found recent evidence of mathematics being applied to intrude upon civil liberties. "The power of mathematicians to make sense of personal data and to model the behavior of individuals will inevitably continue to erode privacy" (Bloomberg). As the world opens to new technology,

businesses have started to, for instance, track users' information online to promote their products and services. Even the United States government, at one point, was guilty of invading confidential data: congress was required to investigate the "mining of phone and Internet traffic in its effort to sniff out terrorists" (Bloomberg). Despite risking the security of many in some ways, mathematics is practical in establishing "the most popular security and privacy measures, from chat encryption to secure backups" (Klosowski). For example, one method people use to secure their information is encryption—requiring the user to identify a secret password to gain access to a file. Passwords can come in multiple combinations of numbers and characters, and they can be used to protect emails, chatrooms, and computer files; setup times can range between five to thirty minutes. In short, numbers are used to securing secretive information.

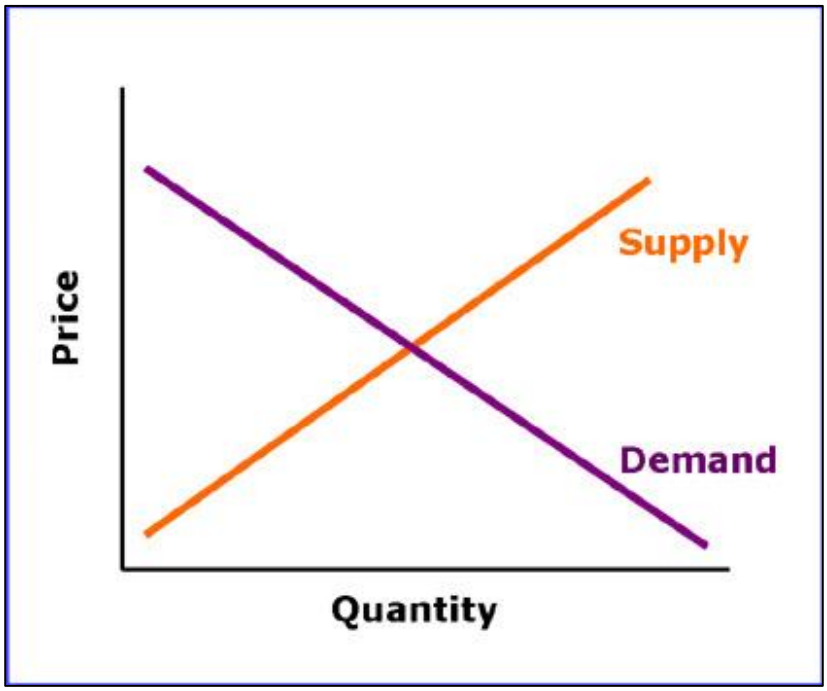

Figure 1. Supply and Demand

General yet highly imperative, without mathematics, little to no one would successfully understand how businesses manage their expenses and stock. Economists—people who study the economy—rely on mathematics to "ensure their personal judgements, inferences, or theories"

(Vitez). They use mathematics to create economic models—models that "describe various functions in the economic marketplace" (Vitez). For instance, refer to the supply and demand model, a theory defining the effect that the availability of a product and its level of desire have on its price. Given the "supply and demand" for a product, economists must understand how these two factors affect the price. According to the supply and demand model, when the quantity is low but the demand is high, the price rises; so when the demand and price for a product escalate, businesses tend to increase the supply to meet the demand, thus reaching the equilibrium—the state in which supply and demand are balanced. Mathematics is involved in supply and demand, because it is functional to answering how much a business should produce and how high the price of a product should be. In other words, it is vital in determining how much should be produced, how high the price should be set, and what should be produced.

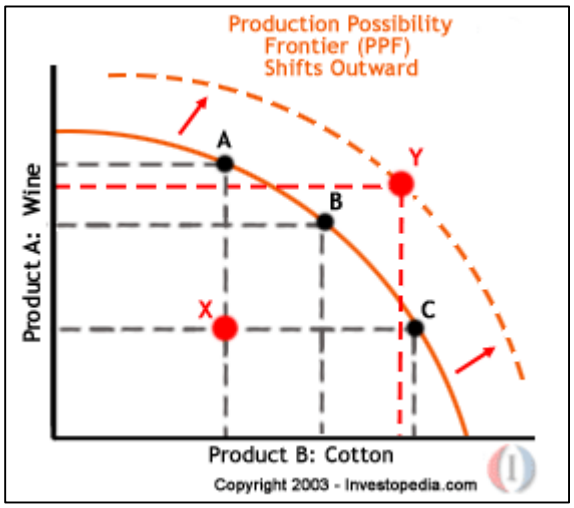

Figure 2. Production Possibilities Curve

After understanding price, supply, and demand in an economy—all in which involve numbers—businesses and companies seek to efficiently use the factors of production: land, labor, and capital. Mathematics is not only significant in determining the supply, demand, and price of a product; it is additionally essential to determining the amount of resources necessary to

produce an object and how much should be sacrificed to efficiently produce another item. For example, a business decides to produce both wine and cotton. How a business can produce wine and cotton in the most efficient way is seen in a production possibilities curve—a model that "represents the point at which an economy is most efficiently producing its goods and services" (Heakal). As seen in figure 2, the producer must divert some of the wine's resources to increase the production of cotton (point C); the producer must reduce the resources used to produce cotton to produce more wine (point A). Point X shows that the resources are not being used efficiently to produce enough cotton or wine, but point Y shows an output that cannot be reached by the current economy. Mathematics is chief to finding the number of resources needed to produce one item while producing another; numbers referring to land, labor, and capital furthermore determine underutilization and efficiency by economic standards. It is functional to determining not just supply and demand, but moreover efficiency, the use of resources, and production possibilities.

Overall, mathematics is important to understanding the economy and how it can be boosted. Mathematical models such as "supply and demand" and the "production possibilities curve" helps economists understand and describe certain relationships between quantities including prices, production, employment, saving, and investment. The supply and demand model refers to how much of a product or service is desired by customers and how much the market can offer; the production possibilities curve represents the amount of two different goods that can be obtained by shifting resources from the production of one, to the production of the other. Though while mathematics is said to have crossed the lines regarding secrecy, there are techniques which implement numbers to secure a person's privacy. It is important to understand mathematics to fully grasp economics: such understanding is compulsory to maintaining a

business, strengthening the economic system, and most importantly, achieving prosperity. “From fledglings like Inform to tech powerhouses such as IBM, companies are hitching mathematics to business in ways that would have seemed fanciful even a few years ago” (Bloomberg). However, businesses that apply mathematics to their advantage commonly generate up to millions or billions of dollars. A decade ago, Amit and Balraj Singh sold Perabit Networks—a company that developed algorithms for genetic research—for $337 million. Indeed, entrepreneurs are grossing hundreds of millions of dollars not just solely for applying mathematics to financial situations, but also implementing mathematics as a function of their products and services. As the economy falls into the realm of numbers, if one wants to survive in the real world—it would be a wonderful time for him to learn math.

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