

# SUPPLY AND DEMAND

Nikhil, Vipin Shukla

*Department of Information Technology, Dronacharya College of Engineering*

**Abstract -- Supply and Demand is an economic model of price determination in a market. It concludes that in a competitive market, the unit price for a particular good will vary until it settles at a point where the quantity demanded by consumers (at current price) will equal the quantity supplied by producers (at current price), resulting in an economic equilibrium for price and quantity. The main purpose of this paper is to discuss supply and demand in the framework of system dynamics. Firstly a review of classical supply and demand and then we look at how to model supply and demand using system dynamics.**

**Index Terms– economic, equilibrium, dynamics, model**

## I. INTRODUCTION

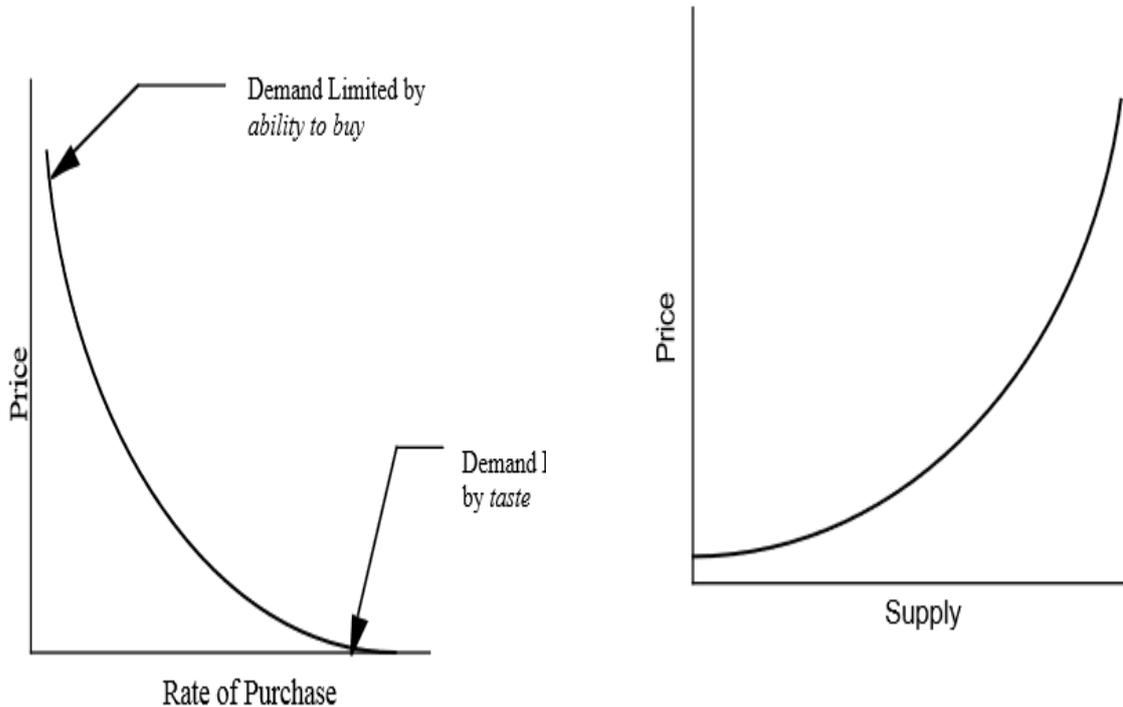
This paper emerged as an attempt to use system dynamics to model supply and demand. Classical economics presents a relatively static model of the interactions among price, supply and demand. The supply and demand curves which are used in most economics textbooks show the dependence of supply and demand on price, but do not provide adequate information on how equilibrium is reached, or the time scale involved. Classical economics has been unable to simplify the explanation of the dynamics involved. Additionally, the effects of excess or inadequate inventory are often not discussed. In the real world, the market price is affected by the inventory of goods held by the manufacturers rather than the rate at which manufacturers are supplying goods. If the manufacturers are supplying goods at a rate equal to the consumer demand, the static classical theory would propose that the market is in equilibrium.

## II. CONVENTIONAL SUPPLY AND DEMAND

This section deals with supply and demand as sometimes taught in high-school economics classes. The following descriptions of supply and demand assume a perfectly competitive market, rational consumers, and free entry and exit into the market. Economists also make the simplification that all factors other than price which affect the quantity of goods sold and purchased are held

constant. Economists argue that this is a valid assumption because changes in price occur much more quickly than changes in other factors that may affect supply or demand. Examples of these other factors include changes in taste, changes in the state of the economy and long-term changes in production capacity (such as the construction of a new factory).

**Demand :-** Demand is the rate at which consumers want to buy a product. Economic theory holds that demand consists of two factors: taste and ability to buy. Taste, which is the desire for a good, determines the willingness to buy the good at a specific price. Ability to buy means that to buy a good at specific price, an individual must possess sufficient wealth or income. Both factors of demand depend on the market price. When the market price for a product is high, the demand will be low. When price is low, demand is high. At very low prices, many consumers will be able to purchase a product. However, people usually want only so much of a good. Acquiring additional increments of a good or service in some time period will yield less and less satisfaction. As a result, the demand for a product at low prices is limited by taste and is not infinite even when the price equals zero. As the price increases, the same amount of money will purchase fewer products. When the price for a product is very high, the demand will decrease because, while consumers may wish to purchase a product very much, they are limited by their ability to buy. The curve in Figure shows a generalized relationship between the price of a good and the quantity which consumers are willing to purchase in a given time period. This is known as a simple demand curve.



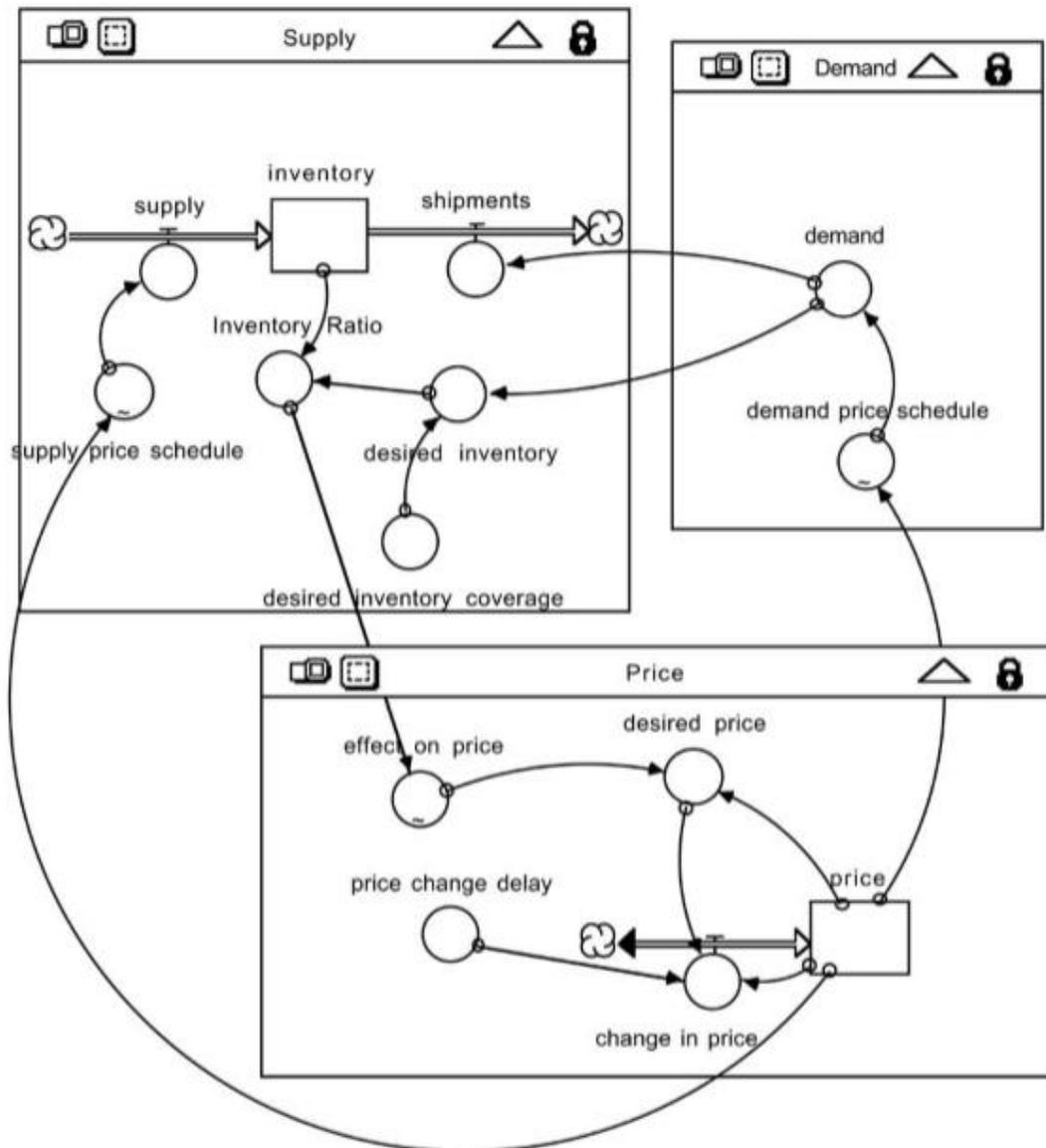
Supply:- Willingness and ability to supply goods determine the seller's actions. At higher prices, more of the commodity will be available to the buyers. This is because the suppliers will be able to maintain a profit despite the higher costs of production that may result from short-term expansion of their capacity. In a real market, when the inventory is less than the desired inventory, manufacturers will raise both the supply of their product and its price. The short-term increase in supply causes manufacturing costs to rise, leading to a further increase in price. The price change in turn increases the desired rate of production. A similar effect occurs if inventory is too high. Classical economic theory has approximated this complicated process through the supply curve. The supply curve shown in Figure slopes upward because each additional unit is assumed to be more difficult or expensive to make than the previous one, and therefore requires a higher price to justify its production.

Interaction between Demand and Supply :- Demand is defined as the quantity (or amount) of a good or service people are willing and able to buy at different prices, while supply is defined as how much of a good or service is offered at each price. How do they interact to control the market? Buyers and sellers react in opposite ways to a change in price. When price increases, the willingness and ability of sellers to offer goods will increase, while the willingness and ability of buyers to purchase goods will decrease. To illustrate more clearly how the market works, we will look at the following example from the clothing industry.

### III. COMPLETE SUPPLY DEMAND MODEL

Naturally, no system dynamics model is ever complete. We believe that the model presented is adequate for the purposes of this paper, but there are many possibilities for enhancing it. One possibility is to include the effect of available inventory on demand. The current model assumes that if a product is not currently available, the consumer will simply place an order and wait for the product to arrive, creating negative inventory, or backlog. You may also wish to include structure for increasing the capacity of the supplier. This would allow for increased production without raising the per-item cost. You could also experiment with the dynamics of a non-

## Supply and Demand



durable good market (i.e., food). The possibilities are unlimited and it will help enhance your modelling skills .

#### IV. A SYSTEM DYNAMIC APPROACH TO SUPPLY AND DEMAND

Classical economic theory presents a model of supply and demand that explains the equilibrium of a single product market. The dynamics involved in reaching this equilibrium are assumed to be too complicated for the average high-school student. Economists hold the view that price determines both the supply and the demand. Equilibrium economics defines only the intersection of the supply and demand curves, not

how that intersection is reached. On the other hand, system dynamicists believe that the availability of a product, rather than its rate of production, affects the market price and demand. This means that the inventory (or backlog) of a product is a major determinant in setting price and regulating demand. This model is a hybrid of both views in that it introduces the dynamic effects of inventory into a model that generally replicates the economists' static explanation of supply and demand.

Demand :- Demand in this model obeys one simple rule. It is the demand as dictated by the demand price schedule. The demand price

schedule is a demand curve that indicates what quantity consumers are willing to buy at a given price. The demand directly affects two things. First, it determines the outflow to the inventory stock of the suppliers. This model assumes that the rate of shipments from the inventory is equal to the demand. Additionally, the demand sets the size of the supplier's desired inventory.

Supply:- Basic classical economic theory does not specifically address the effects of excess or inadequate inventory. This model includes these effects. The supply flow is determined by the supply price schedule. The supply price schedule is a supply curve which indicates how much the producers are willing to produce for each price they receive in the market. The source for this relation is the supply curve provided by classical economic theory.

#### REFERENCES

- [1] Joseph Whelan, Kamil Msefer "Economic supply and demand".
- [2] [http://en.wikipedia.org/wiki/Supply\\_and\\_demand](http://en.wikipedia.org/wiki/Supply_and_demand)
- [3] Low, Gilbert W. "Supply and Demand in a Single-Product Market".
- [4] Scheinkman, Jos'e A. and Jack Schechtman, "A Simple Competitive Model with Production and Storage," *Review of Economic Studies*, July 1983, 50 (3), 427-441.
- [5] "Microeconomics - Supply and Demand". Retrieved 2014-10-10.
- [6] Paul A. Samuelson, "Reply" in *Critical Essays on Piero Sraffa's Legacy in Economics*(edited by H. D. Kurz) Cambridge University Press, 2000