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MA Assignment-1

A1

a)
Given equations,

$D(p) = 100 - p^{1/2}$
$S(p) = 30 + p^2$

At equilibrium, we have D(p) = S(p)

--> $100 - p^{1/2} = 30 + p^2$
--> $p^2 + p^{1/2} - 70 = 0$

Solving, the equation using a calculator, we have,

p = 8.19

Putting the value of p in the D(p) equation we have,

$S(p) = 30 + (8.19)^2$

--> S(p) = 30 + 67.07
--> S(p) = 97.07

Therefore, the value of price and quantity are 8.19 and 97.07.

b)
Let $q = 100 - p^{1/2} = 30 + p^2$

Therefore, $(q - 100)^2 = (q-30)^{½}$

Taking square on both sides, we have

$(q - 100)^4 = q - 30$

Solving, the equation using a calculator, we have

q = 97.1

Putting the value of q in the equation, we have

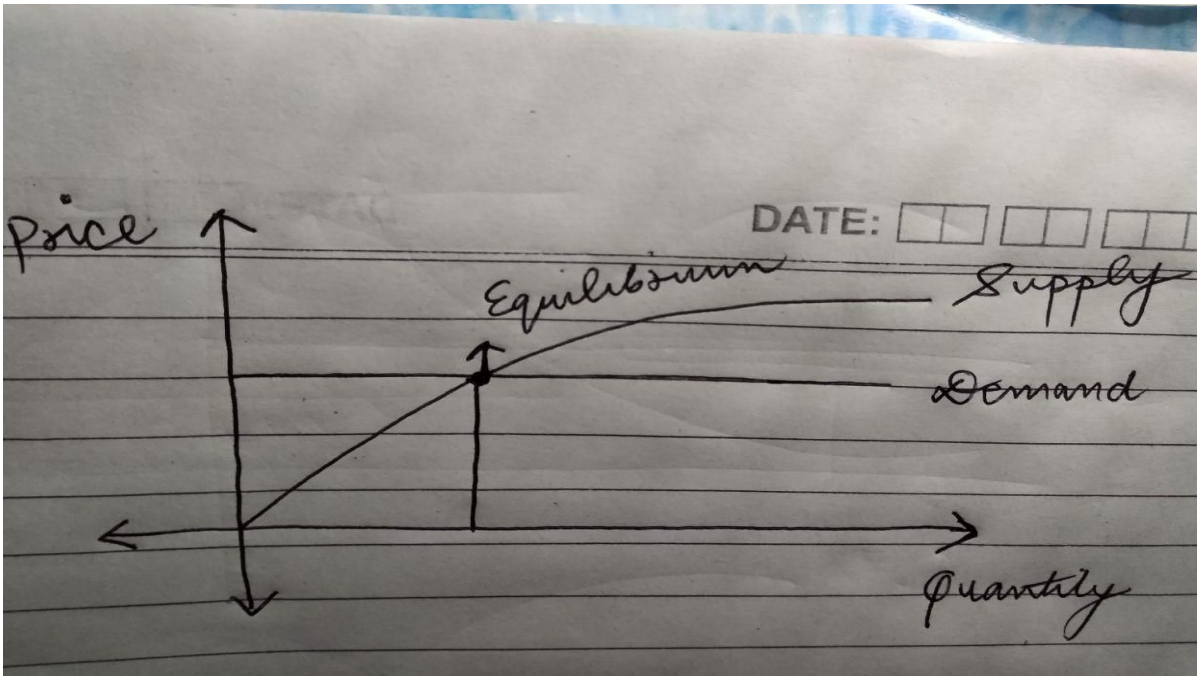
--> $p = (100 - q)^2$
--> $p = (100 - 97.1)$
--> $p = (2.9)^2 = 8.2$

The challenge while using the inverse method is to solve the quartic polynomial for which we need to do approximation to get the values of price and quantity. The answer is the same when done with approximation via the inverse method and the regular method.

A2)

Here are the graphs / scenario for the various parts of question given respectively :-

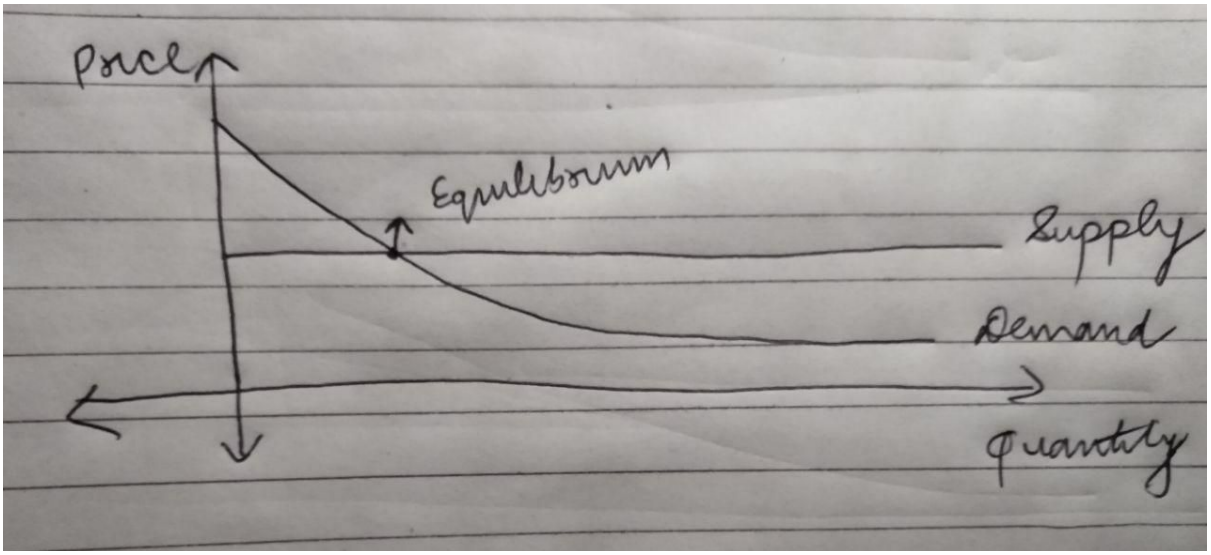
a)



Functions :-

Demand :- Straight Line with constant y
Supply :- Upward part of parabola

b)

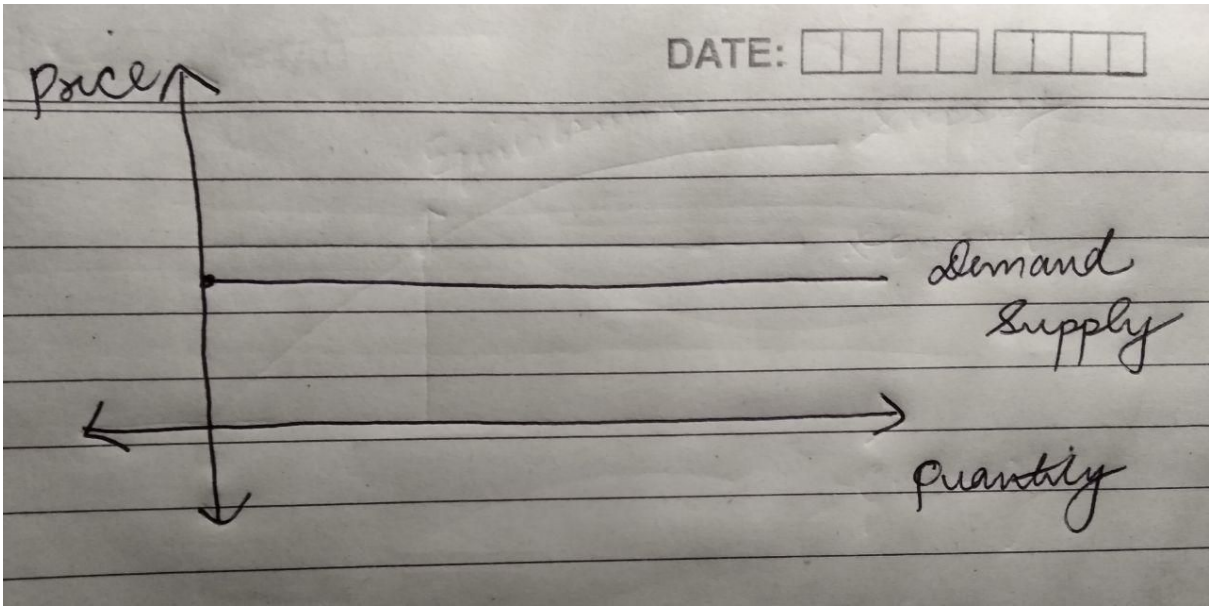


Functions :-

Demand :- Straight Line with constant y

Supply :- Downward part of parabola

c)



Functions :-

Demand :- Straight Line with constant y

Supply :- Straight Line with constant y

d)

Since, both the consumer and the producer surplus are zero simultaneously, this means that the area covered is zero. Hence, there would not be any deadweight loss due to taxation which would result in its value = 0.

A3)

a)
Government borrows the money from financial markets and it is providing goods and services to the consumer in the form of markets of goods and services. Also, households are getting government transfers to compensate against the taxes they pay to the government. The government borrows from the financial markets so that it can spend more without incrementing taxes much. For example, in case of a war, government borrowing from the markets rapidly increases in order to meet the basic demands of people. Households get government transfers in the form of concessional food items, loans at low interest rate etc.

b)
Households get their income in the form of wages from the employer or profit in the form of business. They spend their money by paying taxes to the government and by purchasing the goods for daily needs and services from various service providers to sustain their lives. The rest of the savings of householders are generally invested in the financial markets to gain interest on their savings.

c)
Firms borrow money in the form of stocks from financial markets through IPO's, bonds etc. and invest the money for buying goods like raw materials, machinery for firm and services required to establish the business. In order to run the firm they require man power, land from the factor market for which they have to give wages, rent etc. The profits earned by the firm are distributed in the form of dividends to the stockholders of the financial markets and in the form of bonus to the employees working for the firm.

d)
Rest of the world is also a marketplace. They import goods and services which aren't available in their country or are relatively expensive. Our country exports those goods and services which are available in plenty than some other country. Foreign Direct Investors invest in our financial markets for achieving profits. Similarly, our country invests in some other country as a FDI for gaining profits.

A4)

Nominal GDP

Year No	Nominal GDP
1	(2 * 70 * 50) + (100 * 40) = 11000 INR
2	(3 * 70 * 51) + (110 * 43) = 15440 INR
3	(4 * 70 * 43) + (115 * 61) = 19055 INR

4	(7 * 70 * 67) + (120 * 45) = 38230 INR

Real GDP

Year No	Real GDP (Base Year 2)
1	(3 * 70 * 50) + (110 * 40) = 14900 INR
2	(3 * 70 * 51) + (110 * 43) = 15440 INR
3	(3 * 70 * 43) + (110 * 61) = 15740 INR
4	(3 * 70 * 67) + (110 * 45) = 19020 INR

GDP Deflator

Year No	GDP Deflator
1	(11000/14900) * 100 = 73.82
2	(15440/15440) * 100 = 100
3	(19055/15740) * 100 = 121.06
4	(38230/19020) * 100 = 200.99

Real GDP Growth

Year No	Real GDP Growth
1	(11000/11000) - 1 = 0
2	(15440 / 11000) - 1 = 0.40
3	(19055/15440) - 1 = 0.234
4	(38230/19055) - 1 = 1.006

Inflation

Year	Inflation
1	(73.82 - 73.82) / 73.82 * 100 = 0 %
2	(100 - 73.82) / 73.82 * 100 = 35.46 %
3	(121.06 - 100)/100 * 100 = 21.06 %

4	(200.99 - 121.06) / 121.06 * 100 = 66.02 %

A5)

a) Consumer Price Index (CPI) is a measure for determining the changes in the purchasing power of a currency and calculating the rate of inflation. It is calculated by taking the changes in price for each item in the basket of goods and averaging them out. CPI is treated as a key indicator for determining economic performance and is regarded as the most frequently used method for calculating the time period of inflation / deflation in the economy.

b) There are 3 major advantages of using CPI as measure of economic performance:-

i) **Consistency :-** The consistency of CPI reflects that it is measuring the costs of a certain set a goods which always remains consistent in representing the costs that average consumers face, even as the goods that are included in the CPI evolve with changes in the marketplace. This consistency ensures that the the costs measured by CPI are quite similar from year to year.

ii) **Flexibility :-** The CPI's flexibility refers to the various versions of the CPI that are made that take into account outside factors, such as seasonal adjustments and consumer choice.

iii) **Influence :-** CPI is regarded as one of the most highly viewed economic indicators, as its calculations may impact both equity and fixed-income markets. It is also helpful in shaping public opinion and is used by various market analysts to predict the trends in future economy.

c) There are 3 major challenges of using CPI as a measure of economic performance :-

i) **Inflation Concerns :-** The CPI is often used to demonstrate inflation, but many concerns have arisen doubting its accuracy in that area since many changes were made to transform the CPI from measuring the costs of goods to the cost of living. Due to changes in price, it started to consider the changes in the quality of goods and consumer purchase decisions. Some economists even believe that CPI always understates the value of inflation in an economy.

ii) **Changes in Living Costs :-** CPI does not consider all costs like taxes while calculating the rate of inflation or while measuring economic performance, and hence it does not give a full picture of the changes that occur in living costs.

iii) **Demographics :-** Another problem with CPI is that it does not take into account the experiences of consumers from all demographics. For example :- In particular, the most-watched CPI for Urban Consumers does not measure the climate for rural consumers, where the two may differ considerably. The CPI also does not display separate analysis for demographic groups and any changes may not reflect in the calculation of CPI.

d) There are two major differences between GDP Deflator and CPI. The first one is that GDP deflator only includes the domestic goods that are produced and anything that is imported from another country is simply disregarded. However, CPI includes everything that is bought by the consumer including any kind of imported good or a domestic good produced within the country. The second difference is that GDP deflator measures the prices of goods and services whereas CPI only measures the prices of goods and does not take services into account.

e) The formula for calculating inflation in Year 2 can be written as :-

Inflation in Year 2 = (CPI in Year 2 - CPI in Year 1) / CPI in Year 1

Here, CPI can be calculated by :-

CPI = (Price of basket of goods and services in current year/Price of basket Year) * 100

For getting the inflation for a particular year, we simply take the difference b/w the CPI of that year with the previous year and divide by the previous year's CPI. We can multiply this result with 100 to get the inflation percentage. This means that the difference in the CPI level with x+1 and x year, relative to the CPI level in x year denotes inflation in year x+1

f) The formula for real interest rate can be written as :-

R = Nominal Interest Rate - Inflation Rate

The difference b/w the nominal interest rate and the inflation rate gives us the real interest rate by using Fisher's equation.

Citations

https://pocketsense.com/three-strengths-consumer-price-index-three-weaknesses-consumer-price-index-1108.html
https://www.investopedia.com/terms/c/consumerpriceindex.asp
http://www.econport.org/content/handbook/Inflation/Price-Index/CPI/Differences.html