Lecture – 2

Normally actual output is often measured on the y axis and time on the x axis, but when we talk about business cycles, they create a confusion often they do that with actual output level. If actual output level shows the line going down that means, the rate of change is negative, alright. So, if actual level output line is going down, the rate of change will be negative and therefore, definitely it is a recession, alright, definitely recession. In fact a deep recession when n actual output level is falling, but recession need not necessarily be actual output level falling. Recession can be a situation where, for a few successive quarters, quarter means three months, few successive quarters the growth rate starts falling.

The rate of change value starts declining say from 8 percent to 7 percent 6 percent to 5 percent, that is recession. In fact, that is fall recession and a negative rate of change, alright were the output level itself is falling, and is the severe case of recession, that is often depression. Now the arithmetical error you pointed out, but I did not pay much attention, usually rate of change in discrete data we measure as y t minus y t minus 1 over y t minus 1. And if you use calculus then, it should be d y d t divided by y, I wrote only d y d t this is what he pointed out.

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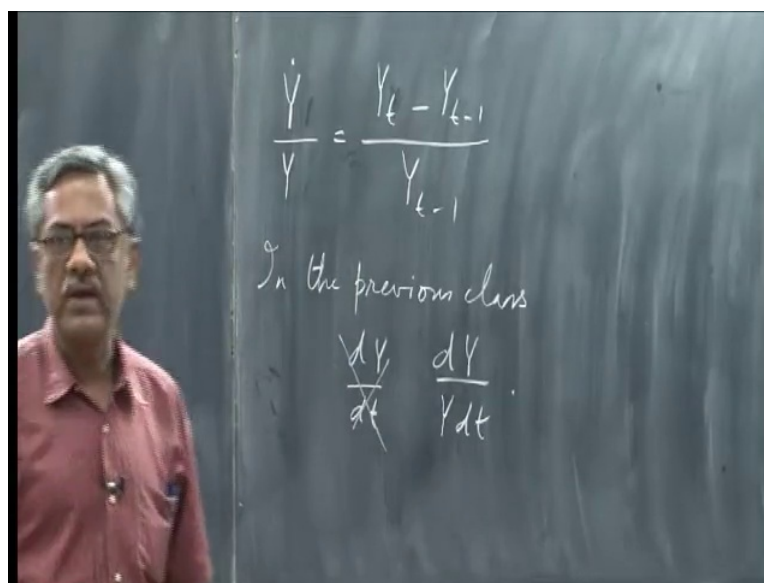
So, you should correct in the previous diagram what I wrote in the last class, previous class as rate of change as y dot is not correct. It will be y dot over y, which in discrete time it will be y t over y t minus 1 over y t minus 1, this divided by y was missing. In the previous class, I wrote d y d t which is not correct, it should be d y over y into d t, an arithmetical error I made using calculus, notation of calculus to measure rate of change, alright. Now, what I was talking about is this business cycles which are essentially short run phenomenon and you have macro models to study them called short run macroeconomic models, short run and long run, short run and medium run macroeconomic models.

Then you have long run macroeconomic models where long term time is taken 10 years or so and very long term can be 20 years, 40 years, 50 years, 100 years whatever. If you have observed, if one watches the data, how it behaves, one does find very interesting situation. In the 80s, late 70s and 80s in the western world and India witness that in the 60s I have seen data. Your situation where, you have chronic unemployment, economy is in deep recession and you have a very high inflation and economies found it very difficult to explain why the situation where you have chronic unemployment and you have very high inflation.

Because, they believed in Keynesian model and Keynesian models where demand management models, if any of economy is there demand curve can shift and correct. So,

if demand curve shifts and corrects recession what you would, find the growth rate should be high ((Refer Time: 04:55)) maybe. But you cannot have a situation with growth rate is negative, output falling and high inflation, demand curve shifts do not create that. There is something else which was creating it in the economies, where you have high inflations and low output level.

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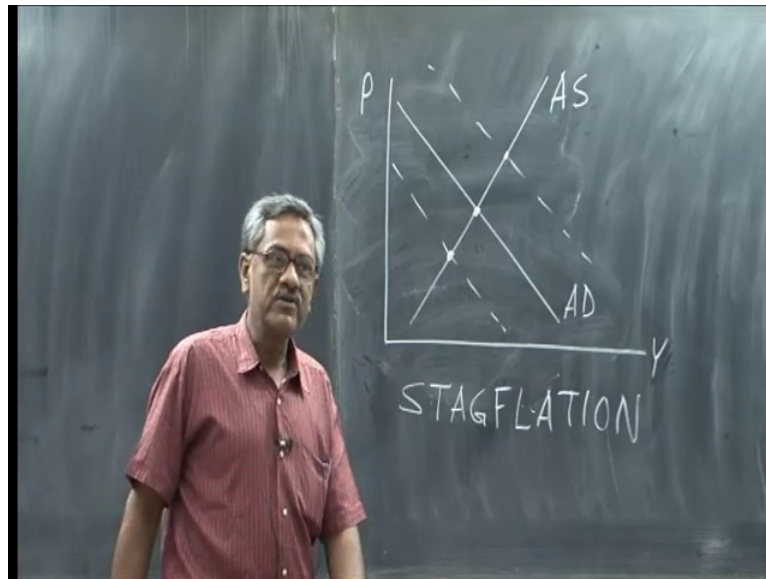
And if you, if I go back to the demand supply diagram what you will find is that, if you draw a diagram say y is output and p is price and you have the demand curve called aggregate demand in macroeconomic, the aggregate demand. And you have aggregate supply curve then, any demand shift to cure the economy would involve higher output as well has higher prices. You take any artificial shift in the demand curve, what you see the intersecting point is going from here to here, where you have higher prices and higher output level.

So, growth rate, high growth rate in an economy can be associated with inflation in a dynamic frame work, it is the static frame work, we do not have insertion here, we have any kind of indication of price movement. Similarly, if demand is slumping, is shrinking in the economy and demand curve shifts backwards then, what you will notice is that low output or falling output level and falling prices also because economy would move somewhere here. So, the price is coming down, output is also shirking, but when you have the situation where the prices are going up and output shirking.

They realized the Keynesians demand for management policy is a not working anymore, which they believed in, which something else going on. And in very simple words, if output is shirking and if prices are increasing, you have shocks in the economy emerging from the supply side. Because, you look if you shift the supply what you will find is output would shrink and price would go on. Now, when supply curve disturbances or supply disturbances are creating this, then demand management policies cannot work. Because, if supply curve is shifted and you shift the demand further, it may increase some output level, but prices would go up even further, which is not a very good thing because you are not controlling inflation.

Now you have a situation in economy where you have recession or unemployment, with falling output level or falling growth rate of output levels, along with rising prices, continuously rising prices, inflation. So, you have to deal with both and if in terms of, in terms of demand and supply diagram, if this is because of supply shocks then, demand management policies cannot work. Because, demand curves may counter falling output a little bit, if you shifted to the right, but it will increase the prices even further. So, inflation will get a boost from the demand management curve. So, you will not be able to manage both inflation and unemployment problem with demand management policy.

If you have a situation where falling output level is associated with rising prices, which we called stagflation, that is the word we use. So, we need to see what happen therefore, the economic, macroeconomic theory we change because you can see the solution therefore, will happen to come from the supply curves, supply management not demand side. What happen in the recession last two years in India, anybody paid any attention? They were talking about inflation, did you notice that and falling growth rates of output, have you heard that, what kind of policy did government of India adopt? No tax breaks as such, money controls, monetary policies I will talk about that, which are essentially demand management policies.

Do you think that would have worked? Demand management policies were controlling money, what would it do? If you are controlling money means, reducing demand I will explain why money is part of the demand later. If controlling money, typing money which Pranab Mukherjee was doing with the RBI governor, was advising the RBI governor to do that. You are essentially trying to controlling inflation to shift in aggregate demand, which is backwards, what would happen to the output level then? So,

what is the result getting now, negative IIP, growth rate GDP falling, wrong policy the policy that UPA two governments adopted to deal with the macroeconomic problems. Where, you have a stagflation like situation where growth rate is falling and inflation is there, a demand management policy can never work.

Student: Aggregate demand shift will at least bring down the prices.

What did I teach you since morning today, ((Refer Time: 10:41)), how can there be priority if you control the recession, how can it be a priority if people lose jobs, we do not care, we only care about price control. That is exactly that stagflations I was trying to the talk about this in the morning, that you cannot control both the objectives, you cannot have the both the objective meet with the demand management policy. That is what is precisely wrong, but he is finance minister you are not, you can make the statement, but he cannot. So, here now you would try to, you would learn, you would learn why macroeconomic theory, at least a theory course is important. I would understand, alright.

Now, having said that we can talk about a little bit more, I would just briefly mention a few things which have become very popular in the literature, which is there in the literature for a long time. And there are few things I would add ((Refer Time: 11:46)) put it in you, on the board today and then we will go and get into the end of this topic so that, I can start a new topic. We wasted the first two lectures a little bit because you people where not here. Now, when we talk about the growth rate you must have heard me saying that, growth rate is the associated with unemployment or employment, which is common sense.

If economic is growing more output is producing, they must be using more labor services. So, more people are getting job, it is very simple common sense, but there was an actual empirical investigation, when growth rate changes how is employment unemployment that is associated. It was done in the US for briefly in the past, during the data period they took is 1951 to 2003 and they did an estimate. Let us see whether it makes sense you or not, this is just empirical research that was done, it is mentioned now in text books also.

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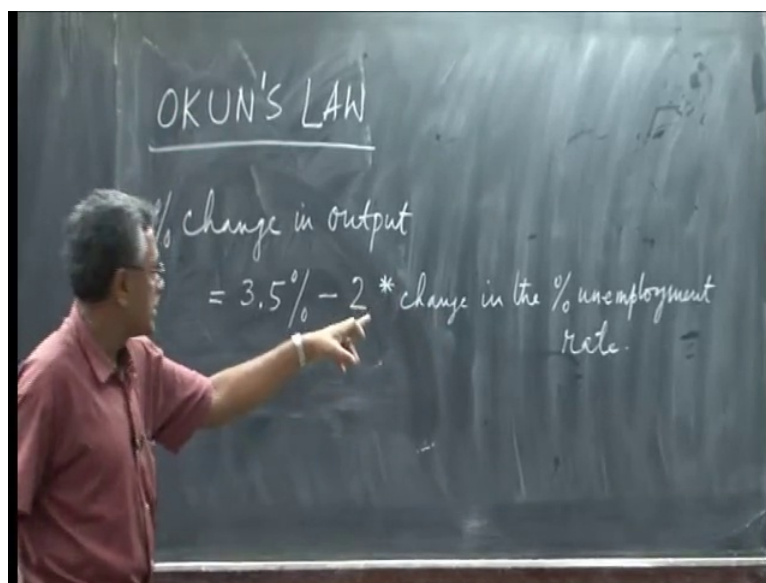
The empirical literature, this is called Okun's law. Now, what is this law I do not know whether people still accept this as law, they use the data period. Okun was an economist, we use the data period 1951 to 2003, data period they used and they, he found following relationship. I do not know whether it will interest you or not, percentage change in output is equal to 3.5 percentage minus 2 into change in the percentage unemployment rate. So, the percentage change in output that will take place in the economy, if it does suppose the economy recovers by say, suppose output growth rate falls by 2.5 percent. So, the percentage change in output is minus 2.5 percent.

Now, you can solve the change in unemployment rate that you take place minus 2.5 percent minus, if you take this number to the other side is minus 3.5 percent. So, how much it will become 2 and 3, 2.5 percent minus 3.5 percent is 2 and 3, 5, 6 percent, alright 6 percent. So, minus 6 percent and this is minus 2 percent into change in the percentage unemployment rate. So, unemployment rate how much it will change? So, it will be 3, 2 minus, minus will cancel out. So, 6 divided by 2, 3 is the change in the percentage unemployment rate, 3 is the number. So, unemployment rate will increase by 3 points, alright.

So, when the economy growth, economy's growth rate declined by 2.5 percent then, unemployment rate will increase from say 5 to 8 percent, 3 percentage point. So, decline in output by 2.5 percent will give rise to more unemployment, increase percentage wise

which is 3 percent. So, this is relationship which you often connect you use, but we do not know exactly how they related, but this is one attempt that was made by to okun to find out what the number is. We can find out the number, problem with India it does not have the unemployment data. So, it is very difficult to do here alright this is okun's law that I was talking about continuously and were he in fact somebody attempted to measure that, in US. And why is the growth rate shrinking and unemployment is more?

Because, you can see what companies do when they hit the recession, they lay a workers and because of the social pressure or the pressure that exists in the economy that they can be laid of, they make a smaller staff do the work over bigger number. And the reason wise 2 for 1, you getting more work done by the existing employ because there also under the threat, they can be lay off. So, they working harder second, by laying of people you say the huge amount of cost for the company because the companies usually have to ((Refer Time: 17:24)) which update.

One is when the company is been set up, this are called fix costs, buying the land, building the factory, constructing it, buying the machines, production is yet to begin. Huge amount of fixed costs, this is what is taught in microeconomics, a large amount of fixed costs are there and once the company starts producing goods, you still incur cost. Because, you pay for the variable costs, the raw material that you purchase, alright the other costs, the administrative costs you hire the labor, you pay their wages and when the variable cost begins, the largest amount of cost in the total structure is the labor cost. So, the

Company is in recession, economy is in recession and company is not telling much, when it tries to cut corners and wants to save costs, the first thing it does is lay off workers. Because, you save a huge amount of money by not having the wages, the perks the insurances etcetera that you are otherwise paying, alright. So, labor is that the mercy does not sell off its capital goods [FL], what it does initially, the initial reaction is to lay off workers, that is how they save lot of cost. And also the existing staff, which remains work harder and they are under the gun to work harder and if they do not, they would be laid off too.

And if there is unemployment, company would have good time too because the company can hire people at the lower cost. Recently, now when the economy was booming, when

the company finds difficult to hire IIT graduates without paying good salaries, but when the economy is down, they can get easily good IIT graduates, people like you at a lower salary. Because, you are not also finding the job you see how it works, all it is common sense, but you have to connect them, economics is essentially common sense, but you have to connect them.

So, you see a 2.5 percent dip in the growth rate of output, national output means the macro unemployment increases by 3 percentage, according to united states why is it so? That is why and also you have this capital intensive methods of production, when modern age is modern technology, capital production method where, earlier you would have had labor hired to do the work, but the machine can do the work of 10 labor. So, why you had 10 labor? Because, at the price of 5 labor you can get the machine and machine would produce more than 5 labor. This capital intensive methods of production like even automobile plants, I have seen shows on t v, when they show the assembly line of the automobile plants, modern automobile plants in western.

Even in India, they are often using robots, there is a labor standing making sure that the robot is functioning properly and doing the job. But actually 5 people are not around the cart to do the job, it is the robot hand which is moving and putting things in place. So, capitalists replace labor so, the quick way of getting rid of labor is one thing. Yes, you have a question.

Student: Why do companies lay off workers in recession?

I haven't got your point at all, you stand up and say louder.

Student: ((Refer time: 21:15))

Smaller amount of output

Student: ((Refer time: 21:26))

Earlier they were producing more when the economy was booming. Now, the sales has gone down, recession means your companies demand has gone down, demand your output. Recession means macroeconomic phenomenon of falling output income level also means demand for goods are going down in the economy. So, the company is selling less. So, it is not required to keep extra 1000 work anymore, labor anymore and also it

does some reorganization, restructuring, giving the present demand. And what it will be in the next 6 months and 1 year, it does a forecast and re kind of organizes the entire maybe some of the things which are possible to reorganize.

And if it is not selling and profits are falling then, they would try to cut costs because profit is essentially total sales value minus cost. So, a is total value minus b is cost in order to increase the profit level, either you increase the a, which is not possible in this session maybe much. So, you cut cost b so, a minus b gap increases and the profit increases, it does a restructure, anyway, let us not get to industrial organization. I talk about that because in this connection. Another thing which we very popular in the 60s when the Keynesiansian economy was very active and later it became a debatable issue, a very hot debate used to take place.

It is the situation, it is the thing of Philips curve and you would understand why Philips curve relationship was expectable to the macroeconomists, at one point and not no longer acceptable macroeconomics later. Because, the Philips curve essentially says this is again an English economist, that was American economist. And here is the English economist with 100 years data. So, very long run data, he found out that in the India, in the English economy the inflation in terms of wage increases, you can measure inflation also in terms of wage increases, not just the price increase. Because, wage is the, prices are connected with the market, the company is paying high wage automatically it will increase the price to cover it.

So, sometimes some economists prefer to measure inflation indirectly to the wage inflation [FL], also an indicator of price increases. One reason people say inflation in India is high because of, the company is paying very high wage people say that. Anyway, we will get in to these detail macroeconomic discussions along with microeconomic theory later; it will crowd your mind. So, the Phillips curve is another relationship which can be very important, in the 60s and people were very happy that Philips found this relationship I tell you. People are very happy because essentially what he said it does make a ground for the demand management, Keynesiansian demand management policy what was the Philips curve.

Essentially, what he found was after having used the data and rigorous it, he found there is inverse relationship between something called unemployment rate and something called pi. Pi is the inflation rate and it is usually measured as prices in this period minus prices in the other period or the prices in the other period. You can put a percentage number into 100, you can do. In case of wage inflation, it can also be measured in terms of wages in the current period wages in the last period divided by wages, in the last period, w is wage p is price, Phillips was using wage inflation.

And unemployment rate u, the unemployment rate which is equal to unemployment rate this is also, something like total number of people unemployed over the labor force. This is the total number of people unemployed and l is the total labor force, this is the total labor force. Total number of people unemployed and the total labor force. Total labor force will be total number of people unemployed plus total number of people employed, it is the total labor force. And you can do the percentage thing here into 100, what Philips found was an inverse relationship between inflation rate and unemployment.

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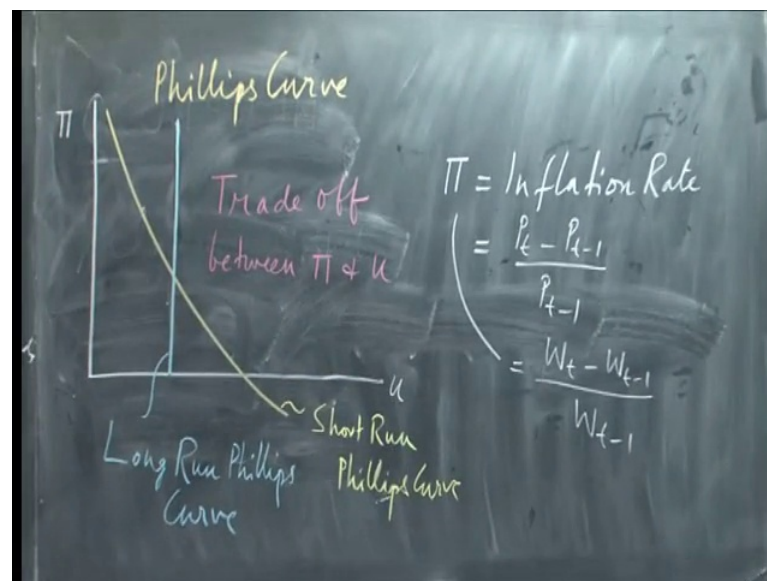
It is, it went on like this, this is the Phillips curve. Now, this is the Phillips curve went on like this, what is this saying? If unemployment has to be reduced, there has to be inflation, a trade off. It essentially talks about a tradeoff, if this is imperially true that means, in England there is trade off that exists or existed for over a 100 years. So, this is essentially talking about trade off, tradeoff between pi and u, this is essentially talking about tradeoff between pi and u. So, in the economy if you have to solve the unemployment problem or English economy the weight has solved the unemployment problem.

But while trying to solve the unemployment problem, it has given rise to some inflation problem, there is a tradeoff. And from period to period that tradeoff may have change the relations, essentially the slope of chain may have changed. If you take the shorter run within this very long run period over 100 years data, we used. But if you take 40 year, 30

year data you would have found the tradeoff had shown a particular slope from 1920 to 1950, prior to 1920 it had another slope. But for the overall period this kind of relation exists because the slope would have changed.

So, the tradeoff could have changed some times it is flat, sometimes it is steep that means steep means a small decline in unemployment rate, that means people getting more jobs is very high increase in inflation. Whereas, if the curve is flat it is staying the large reduction in unemployment was assumed to be smaller amount of increase in inflation. The slope can change, in India if you want to do you may find the different slope. Now the point is, if you go back to the demand and supply diagram that I had, it clearly says if you are trying to solve the recession or unemployment problem through a demand management policy what would happen?

The demand shifts to the right, as soon as the demand curve shifts to the right and intersects the upward sloping supply curve to the right you have output increasing, at the same time prices also increase. And Okun's law is saying, that output increases is associated with decline in unemployment rate. So, the Philips curve as a sound basis in our understanding of the economy, but when the demand management policy started not working, they started failing in the 70s and 80s, late 60s. And you had no such solution possible, then the Phillips curve become invalid then people started to fighting between various camps and Keynesiansian and non- Keynesiansian camps as to, who is correct?

And what happened was after the debate many people agreed that this is the very short run phenomenon, the short run phenomena which is Keynesiansian economics. But no such relationship or a long run exist I will tell you why, exist because it was irritating number of classical macroeconomists, they do not want to see this kind of the relation in the long run. So, in the short run that might exist, but in the long run we do not believe at all exists. They started saying and they said in the long run, they said a very interesting thing, they said if this is the short run and in the long run the Phillips curve is like, the long run Phillips curve is like this.

This is the long run Phillips curve, which has no trade off it is absolutely a vertical line and this phenomenal downward sloping line is essentially a short run, Phillips curve and they tried to prove this data. Now in the long run if it is vertical, what will you say? There is no trade off, alright they are also saying the value on the x axis here, has been

fixed. There is no tradeoff, you may not be restricted in the value on the y axis variable. What do you expect in the value on the x axis, it cannot change anymore, it is a very rigid variable, and this is also saying you are saying.

So, these people who were saying that in the long run reference is vertical and no tradeoff exists, that is demand management policies do not work anymore, are also saying that in the long run you cannot be influenced, the unemployment rate. Because, it is fixed this is very interesting, it is getting very murky, you cannot, not change. So, this u or this small u becomes the small u star and this star variable is very interesting variable, the star variable according to classical economy we will have to find that out later.

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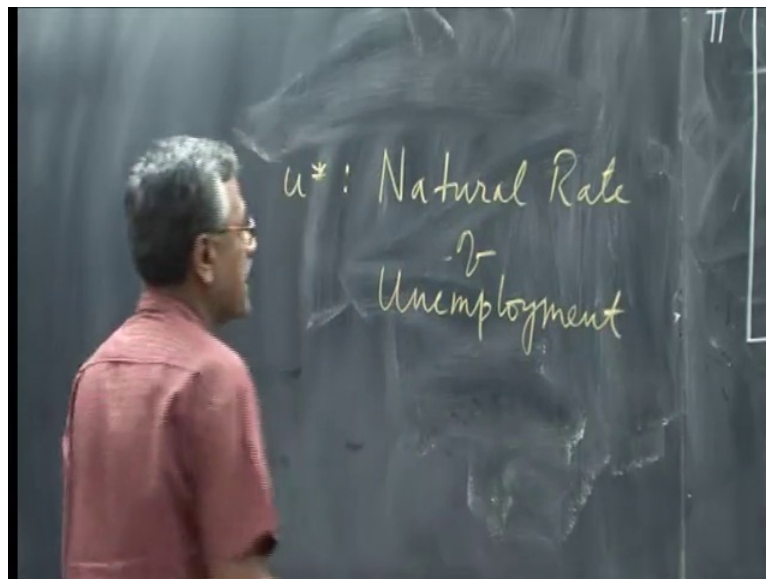
The star variable u star, according to classical economists, this u star has a name this is called the natural rate of unemployment, star is called the natural rate of unemployment or natural unemployment rate. What is natural unemployment rate? I tried to find out, you can try to find out from text book yourselves. Natural unemployment rate it is like the long run unemployment rate, which remains in the economy. Some people would not be employed, it is just like the unemployment associated with full employment I explain in the previous class that, even economy in the full employment, all people are employed, there are some people who do not have jobs.

But that is basically voluntary thing, they prefer not to work in the offers that came to them, they want to wait out a month or 15 days, 2 months for a better job. So, that unemployment is essentially frictional unemployment, it is called frictional unemployment. So, ((Refer time: 33:52)) unemployment is something like that, where it is a long run unemployment and the classical macroeconomics when you will see their models, you see them soon this week probably. You will see that in the classical models, macro models or the new classical macro models where, they essentially talk about long run. They essentially talk about natural rate of unemployment therefore, they must be talking about full employment always, because if unemployment is only natural rate of unemployment which is voluntary, economy must be fully employed.

The question that arises, the economy does not remain in the long run. We do see in the US and the western world, lot of people over the last 2, 3 years were unemployed, looking for the job not finding a job, the economy is definitely not fully employed. We do not have natural rate of unemployment, you have more than natural unemployment to the Phillips curve is no longer vertical probably there. And do not think people are happily unemployed [fl] a month, 2 months, half a year I have enough savings in my bank and then I will get a better job then, i will start working [fl], I do not think exist in the western world today.

So, the problem therefore becomes between, applied between short one and long run macroeconomics nobody want to buy. The long run macroeconomics that, the classical macroeconomics believes in long, run does not understand that economies do go through short run periods severe unemployment. Where, it is not frictional unemployed, chronically unemployed people, as in United States today, alright. So, this is kind of the Phillips curve story, very important debated used to take place surrounding these things. And what I am doing, I am trying to tell you some empirical side of macroeconomics, which has now taken root as theatricals components or components of theoretical models also.

So, one set up theoretical model one often writes an equation to describe the Phillips curve in the model. It is just not an imperial exercise that data is saying, imperial means data is sent the theoretical, laboratory type experiment we do in social science, writing equations, describing relationships through those equations. Writing variables like inflation, unemployment, employment, output growth rate whatever, does have the

equation some time the structural equation called Philips curve. So, I thought I make you aware of it do not get nervous if you find them in books, but I do not want to talk much about that.

Now, I am going to come to the end and sum up this topic. Now, having gone through the background story in macroeconomics essentially what I am trying to do put into your mind what macroeconomics does what it deals with? Now, what my course would do the reaming course except the next topic, is that essentially about construct macro model, theoretical model and we will find them how useful they are, over time and goes to that. So, how do we construct macro model.

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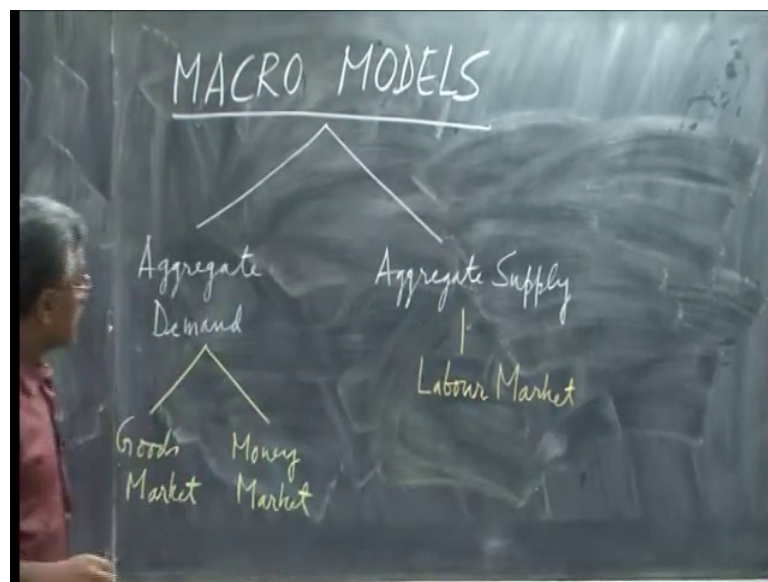
So, well macro models, theoretical models essentially have three components, essentially has three components, macro models. The three components are as follows, these three components they call three markets, aggregate markets, alright. Before I go into the three markets, let me tell you that a macro model is very similar to the micro model that you learned the first stage you open a economic text book.

As soon as you open the economic text book after the definitions, what they tell you is that there is the demand curve for a good and individual can have a demand curve for a good, a market demand can also exist. And there is the supply curve for good, which is either one person, is supplying and many producers are supplying, they are supply curves for goods and the market reaches equilibrium when demand intersects supply.

In macro model we essentially do the same thing, we think that here is an aggregate demand side, which becomes an aggregate demand function later. And also there is aggregate demand supply side, and therefore we in order to construct the macro model, we will have to describe the aggregate demand side and aggregate supply side. Depending upon the assumptions you make about the aggregate demand side and the aggregate supply side, you therefore categorize yourself as classical macro economist, new classical macro economist, Keynesiansian macro economist whatever, new Keynesiansian macro economist depending upon assumption to make.

But one does not go outside this boundary wall of a macro model, which essentially has two components aggregate demand and aggregate supply like, belonging to a political party. Depending upon the policy you announce, you essentially align yourself with either the BJP or the left parties or the congress or whatever depending upon the policies you have. Similarly, here depending on the assumptions which also lead to policies, issues, policy issues you align yourself to classical macro economist side or Keynesiansian side, the new Keynesiansian, the new classical whatever.

Now on the aggregate demand side, structurally talking about there are two components to the macro models, two essentially. One, we have to describe the goods market which is also, sometime known as goods and services market and also we will have to describe the money market. Goods market and a money market and on the aggregate supply side, when we talk about that, what we essentially do is nothing but we talk about labor market. So, these three markets goods market, money market and labor market constitute once you have described them, you have a complete macro model.

So, when I would take up classical macro model or the Keynesiansian macro model, these are the two basic macro models that I would discuss them in detail. That will take up most nearly the course, along with some other things, my job will be done, I would essentially talking about these three components. And you will see the, how the differences would arise, the differences would slowly surface in front of your eyes. And you would also realize that this is so, much of a macroeconomics debate, the debate in macroeconomics is so much of political debate in the western world. You will see that immediately now when you would listen to the speeches and policies you would [fl], what kind of the model or theoretical frame work they have in their mind.

Therefore, which political party they also align themselves in, that also you would know rather democrat or republican or in England you would say the labor party or the conservative party. Labor party would typically be a Keynesiansian type, macroeconomic policies type. The conservatives would typically have classical type, macroeconomic policy framework. Now there are issues here we would go into that later, many people have asked me students in the past, sir in the market here we do not see the stock market, which is so important, where is the stock market?

Sir, you should talk about the stock market they will say, I said this is very good question, this is very clever thing that macro economists usually do. They keep the stock market in the background and they connect it with the money market. So, having focus to discuss the money market they can now through that connection like a tunnel, they can go to the stock market and then tell you what is happening in the stock market. So, they are connected, but not explicitly on the board there, as a separate market to be modeled. That does not means stock market models just focusing on stock market does not exist, it is enormous literature on capital theory, financial economics, finance which does not do anything.

But study in detail how the stock market functions or the issues related to the stock market. But in the macro model under economics called macroeconomics, we do not directly deal with the stock market, we keep that in the background. How we keep that in the background often text books will not tell you, but I will tell you, it is not ignored, but it is in the background. If anything is happening in the money market would tell you therefore, what will happening in the stock market and the goods market is often goods and services market, I am ignoring that word. Because in the macro economy you just do not produce goods, you produce goods also.

In micro economic often a company is producing a product, shirts, watches, furniture, company producing it, bicycle, automobile. But from the macroeconomic point of view is like the father looking at the entire family, you do not ignore the girl child, you do not ignore your wife, you do not ignore your mother who is present. So, for the macroeconomic point of view you have goods produced and services also. In fact many of you would be working in service related companies, you would not produce any goods. Software companies, out sourcing companies, Narayan murthy's company, it does not produce any goods it produce service, lawyers produce service, doctors gives

you medical services. IAS officers, bureaucrats do not produce goods produce services, MP's, MLA's, ministers [fl] me what am I producing, am I producing any good?

I am giving you some services called as education. So, in the macro economic sense the words always you will find these in text books, they are talking about goods and services. But you go to the micro economics book you will see a company, a firm producing product, a firm producing good all these the example, hypothetical example is always in terms of a good. But in macroeconomics you make sure that you have ignored that word, services there, alright the goods and services, money market and labor market. So, my task would be bring them up together, these structural features and how we would proceed with macro model and policy issues is very simple.

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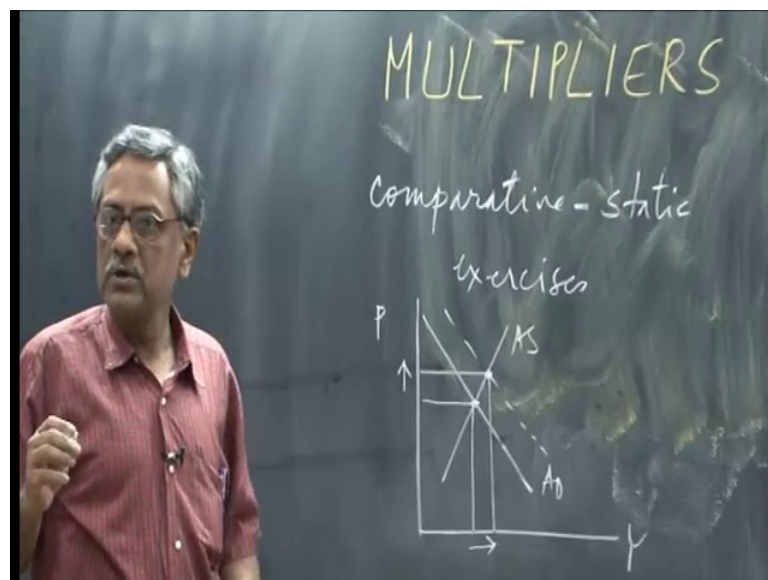
It is that after having the described the macro model which we think, roughly describes our country or an economy, modern economy then we look into various what are known as something like they are called comparative static exercises. We will look into something called static exercises, you are wondering sir this is a very difficult word sounds like we are in the philosophy course, we are not. It is very simple thing to understand, what are these exercises, comparative static exercises? If you look at the demand curve remember, if you look at the demand curve, when you have a good here and a price and you have demand and you have supply, market demand and supply.

This is a static frame work, it is not a damping frame work where the variable do not have the time derivative, p and y acute value, not the time derivative not p dot, y dot. This static frame work gives you a static equilibrium point where the two curves intersect and because of the opposite forces, they balance each other and the remaining equilibrium. Competitive static exercise essentially means what we will do, suppose there is the shock, a supply or an aggregate demand shock which shifts the curve and you reach a new equilibrium point.

Suppose there is a demand shock, we reach the new equilibrium point then, Competitive static exercise essentially means when we reach the equilibrium point, how far is it, how far did we go, what are the changes that would took place? So, from here this diagram you can see that the prices are gone up and from the output level we can see that output has gone up. So, compare means we compare to static equilibrium points, we compare two static equilibrium points after generating an artificial shock to the system which can be used to understand in the real economy and an actual shock take place. Either the oil price in the world has gone up or there is a world recession, the financial market clamp down or crisis in the western world or there is a war in the Middle East.

How does this shock start affecting your economy? Like, if you stand on the sea show, there is the storm thousands of miles away, how is it affecting your coast line? You see the waves are rising or in case of tsunami, there is an earthquake in Indonesia, the tsunami is felt in Kerala, alright. Either it can be a distant shock or it can be a very close shock and when the shocks occur in real life, it does occur comparative study exercise essentially what we will do algebraically, it should try to measure how much the changes are in the variables, particularly indigenous variables. These Competitive static exercises are all often referred to in text books and I have described in terms of something called multipliers.

These are also called, something called multipliers, alright and I will explain why they are called multipliers. And not only that, these kind of Competitive static exercise method would also allow us to study the implications of various government policies and the two kind of policies that we would continuously talk about in this course is known as fiscal policy and the monetary policy, I will explain them to you. So, when we will talk about fiscal policy and how it can improve or whatever it can be, how it can affect the

economy. Essentially we would talk about competitive static exercises and our explanations are in terms of multiplier.

Suppose we say this fiscal policy type a is more effective than fiscal policy type b. What we are essentially doing is that in type a what is the value of multiplier and in type b what is the value of multiplier, we compare two numbers simple numbers. And if one number is bigger than the other number we say that is more effective. So, these Competitive static exercises which are in terms of multipliers will also be used to talk about policies, government policies or public policies. Fiscal policy in macroeconomics in different areas of economy we have different kinds of policies to be discussed. In macroeconomics the two conventional sets of policies that we discussed or fiscal policy which has to do with the finance minister, taxes etcetera, government spending and monetary policy which has to do with the central bank of the country.

In our case it is the reserve bank of India, what they do. So, the headquarter of monetary policy in any country is the central bank, the headquarter of fiscal policy in any country is the finance ministry. And you have seen why policies are required in the business cycles I told you, the economy is plotting out too quickly it has a tendency to clash. So, we require appropriate policies to control it. So, it does not increase too quickly, rise up slowly remains there at higher level comes down again slowly, in disciplined we are trying to control, alright. It is not going to sound, look very funny probably. Suppose there a very undisciplined child we are going to control so, what we did?

We had a small string on his left palm, another string on his right leg, alright and he tries to run too quickly, we pull them. So, we have a soft cover on the floor so that, when he falls he does not hurt himself, he is not allowed to run quickly. If you want to run, run slowly so, the string does not pull. The economy, that is hoe policies are also used not only to recover from the recession but also to control the movement of the economy so that, it does not become ((Refer time: 53:28)) does not become, there are too many short changes policies are required, alright.

Now, the last bit of point that I want to measure and then, I start a new topic I have already said. Therefore, macroeconomics I have been telling you so, much aligned with the political systems, on the political debates on the country that, by looking at the

models you can clearly say which is the macroeconomics debate that takes place whether, it is the Keynesiansian type or classical type or whatever.

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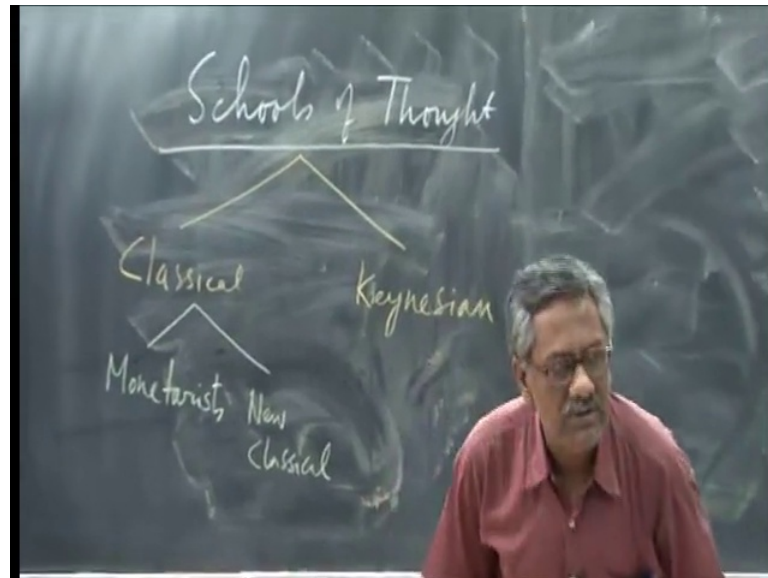
And that will be call the schools of thought, the schools of thought. Initially there used to after Keynesians theory of employment invested money in 1936 they became two schools of thought. But when Keynesian was a student, there used to be one thinking of macroeconomics, classical macroeconomics. Imagine my teachers are classical economists, I became Keynes which is preaching, which started preaching completely opposite what my teachers thought me. So, probably they became the greatest of enemies after that, the teacher and student. Schools of thought, the classical these are the original two groups and the Keynesians, the schools of thought.

And essentially I told you the classical tools is more, it is long run macroeconomic model and the Keynesians is more short run and medium run. The classical student does not believe the government can do anything to the economy, it is in the long run equilibrium and employment is natural rate of unemployment. That is, economy is fully and the economy cannot do anything about it, very interesting. Typically, what we had to prove that point is the supply curve they make it vertical, if the supply is vertical demand management is not going to work. Demand can only push up and down the prices, x axis value is fixed, but when Keynes came he made the supply curve normal upward sloping.

So, if supply curve shifts there can be effects, if demand curve shifts there can effects, both on prices and output.

So, Keynesians policy is more of government intervention is sometimes required, useful and effective, classical economies are like ideal situation, they take, a polar extreme. They say no way government intervention can work in the economy, government should intervene. Politically we find typically these two parties, republicans would believe in US and the conservatives in England. In Europe elsewhere also you have the same thing, you have the rightists, right parties, extreme right parties are the classical macroeconomists in some way they believe in classical macroeconomists. And the more you get left, socialist more government intervention etcetera, you start believing them.

And extreme left, if you go to socialism then you go into complete government control, I am not going to talk about that. And extreme right you get, you say government has zero roles which are never happening in any country. Government always have some role to play, the question is how much it has in the economy? Government has the defense, government has the police forces, government has the bureaucrats, ministers all source of activities. Even they are getting into health care, pension because the private sector is not taking care of them. So, government is getting into lot of activities. So, that is either not true, alright then from the classical macroeconomist; there are two offshores and broadly speaking there are two kinds of things that happened.

One was the monetarists, the monetarists, the other one are the new classical school, alright. So, the new classical macroeconomic and the monetarists, So, monetarists and new classical economists, monetarists essentially are saying basically, there was saying is that, money supply is the most important role, it is the classical frame work they have. So, do not full around with money supply, it will push it too high then inflation will be a problem and the new classical macroeconomic is completely uprooting the existing theoretical frame work of macroeconomics. And they are a different way of dealing with situations, they believed in something called the classical belief.

But they also said that agents in the economy are rational, they had something called rational expectations hypothesis. So, agents are rational in the sense agents are exactly what other, the government is doing in particular. So, government cannot have a policy and have it affective. If agents know what government wants to do and the belief or

disbelief is so much, the mistrust that private agent, economic agents like you and me and the company and everybody cannot be fooled by the government policies. So, better government lay off your hands from the working of the economy. They have a new classical macro economy, it is a frame work with different algebraic formulation. Assumptions like rational expectations, which is called rational expectation hypothesis. I may not be able to get into that and the new Keynesian also developed, which got more into various kinds of Keynesians assumptions about market rigidities.

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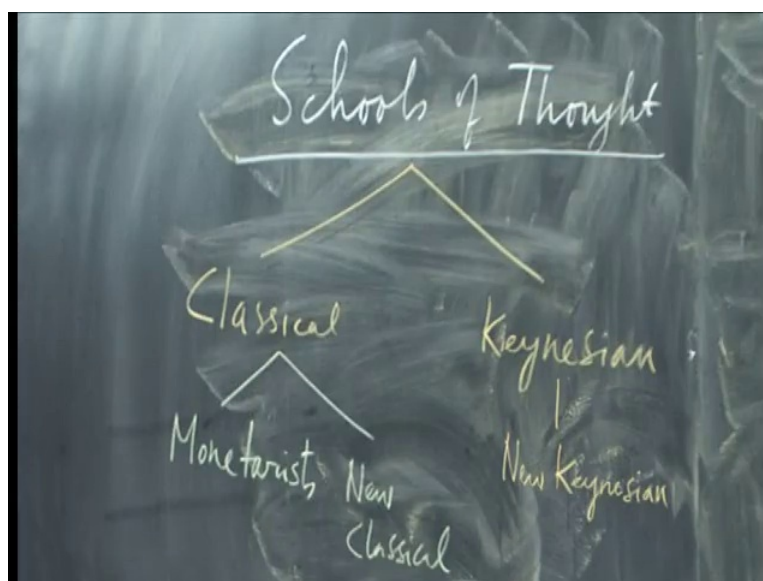
Keynes had an assumption about market rigidities, I would explain that later. So, they got into something called the new Keynesian into market rigidities etcetera, new Keynesian macroeconomists, monetarists or monetarist and a new classical macroeconomics. So, I need not go into all this, at the stage if I get the time I will go through them, the rational expectation models of new classical macroeconomist. So, we would be dealing with the macroeconomic models, but before we do that I told you about macroeconomic models in the various schools of thought that existed.

The interested reader can go into that and try to find out this, what is new classical, new Keynesians macroeconomics people what are they saying different from the previous ones, they are predecessors. Now I go to topic 2 and topic 2 is, topic 1 is over I begin topic 2, do not thing topic 1 I will not ask any question in topic 1 in exam, I will ask question from topic 1. But topic 2 now onwards will get very specific, topic 2 is

measurement of aggregate economic variables that we are talking about output inflation etcetera. I want to give you an idea about how these variables are measured, alright.

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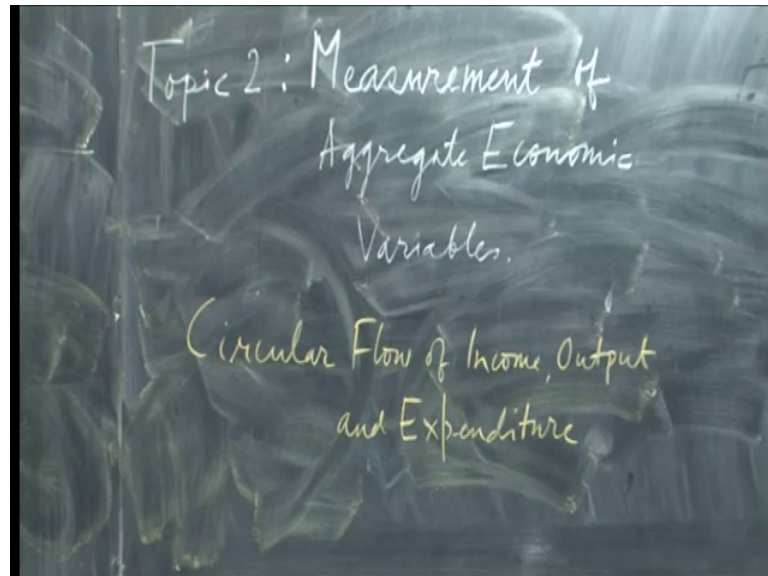
So today I begin topic 2, measurement of aggregate economic variables. This is the topic again going to remain with us, in the next few class, that is few lectures, measurement of aggregate economic variables, alright. Now, before I go into the measurement of aggregate economic variables, I would have a ((Refer Time: 1:02:15)) view our conceptual framework that we use in macroeconomics, before we try to measure the variables. In fact the measurement of variables is based on this kind of a conceptual frame work.

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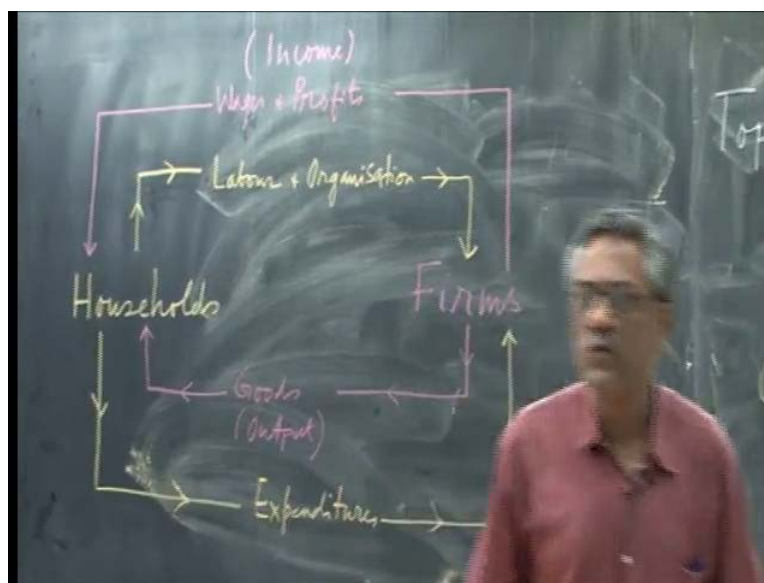
The conceptual frame work, the first part of this topic is known as circular flow of income output and expenditure, circular flow of the income, output and expenditure. Macro economists think that there is the circularity in the activities of a country, they are tied up and how is this tied up? The example I will show you, I can complicate it, but I do not want to complicate it at this stage, but we can do that. It is that normally the simplest form of this, the demonstration of circular flow of the income, output and expenditure emerges from the fact that, your salary from a company tomorrow when you get hired is their expenditure, alright. And their expenditure which is in terms of the salary to you is collected from the output that they are produced and sold in the market.

So, they are all connected, alright they are not in isolation. So, suppose I say there are two groups of economic agents in this simple model, there are two groups of economic agents. One called households, the other one called firms, no government nothing. How do they interact the way macroeconomists see them, these two groups of economic agents means, who carry out economic activities, they interact in the following fashion. First, households supply two groups of factors of production to the firms, what are they? House hold supply two groups of factors of production called labor and organization, to firms.

All those supply labor and order to organization to firms, firms in return supply something called income, wages and profit to the household sector. The firms in return

supply something called income, wages and profits to households, which they supply. On the other hand firms also supply the goods that households require, the various goods and households from the wages and income that they receives, next expenditures and complete the cycle here. These wages and profits are nothing but income, goods that I have mentioned are nothing but output and expenditures are been mentioned as expenditures.

This is the simple complete circle, a circular flow, a phase diagram, it is not a phase diagram a circular flow or output, income and expenditure that one can conceptualize happening in the macro economy. You work for somebody, you get paid and you offer the services, they produce something from services and offer you income and also the output. Now you can complicate this diagram bringing in the third group of economic agents, which are not considered to be part of economy. Important to remember not considered to be part of economy, economy consists of household and firms, but not part of the economy. Something like a moon or a sun sitting outside the world is called the government, government is never considered to be part of economy in macroeconomics.

You can bring in government and can complicate and by putting a government somewhere as a satellite and show how it interact both with the firms and households, in terms of two way flow. One supplying goods and services to the house hold and the firms, you know the services and goods they can supply you with public goods. What are public goods? Which you do not pay like the roads, alone everybody can use them, parks bridges, public goods, public services like the defense services, police services. In return there is a flow of expenditure from the house hold and the firms, which goes as the income to the government known as the tax revenues etcetera, I can complement that.

But remember if I draw the satellite called government here, it is a satellite it is revolving around the private, it is not part of the private economy, moon is not part of the earth, but what moon has can effect earth. What would moon does, sun does can affect their outside. So, when we talk about the economy never think government, we are thinking government is also part of economy. No, it is one error that remains of the peoples mind because we talk about the government all the time, economic policy is government, they are all considered to be outside the economy. And it affects the economy of course, alright.

So, this is how you conceptualize the circularity. If you agree with this circularly, if you have no problem then I can go into the next part actual measurement of variables. And if you look into the books, the text books etcetera, the actual measurement of variables also use the very interestingly enough three kinds of methods. One is called the output method, one is called the income method, one is called the expenditure method. Three kinds of measure they use, sometimes they are considered to be alternative, sometimes there are essential, whatever.

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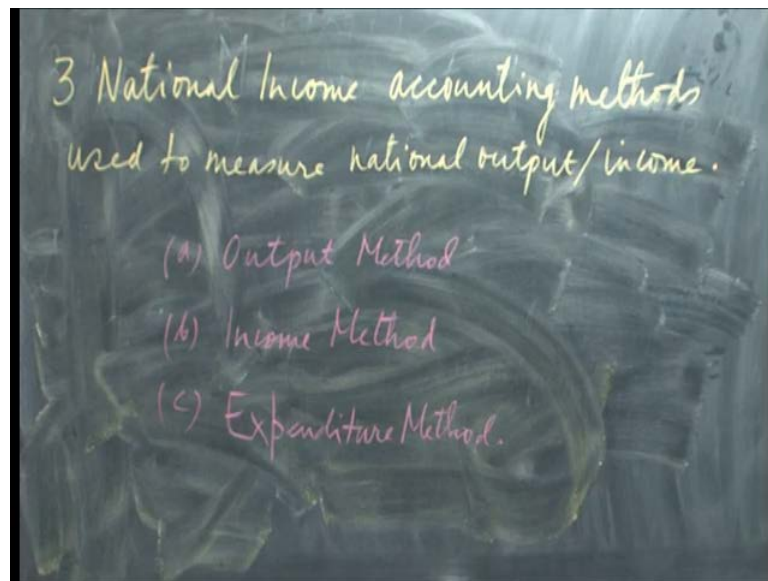
So, when we go into measurement of variables, let us take about the measurement of variables there are three, they are called national income, they are called the national income accounting methods. Three national method accounting methods used to measure national output or income. There are three methods and these three methods that they used are output method, b income method and c expenditure method. So, I have to take them up one by one and talk about that. Output method, income method and expenditure method can you read them? Can you read them or having the problem with red color? No problem. Now let us take up output method, can I erase this part of board, diagram copied?
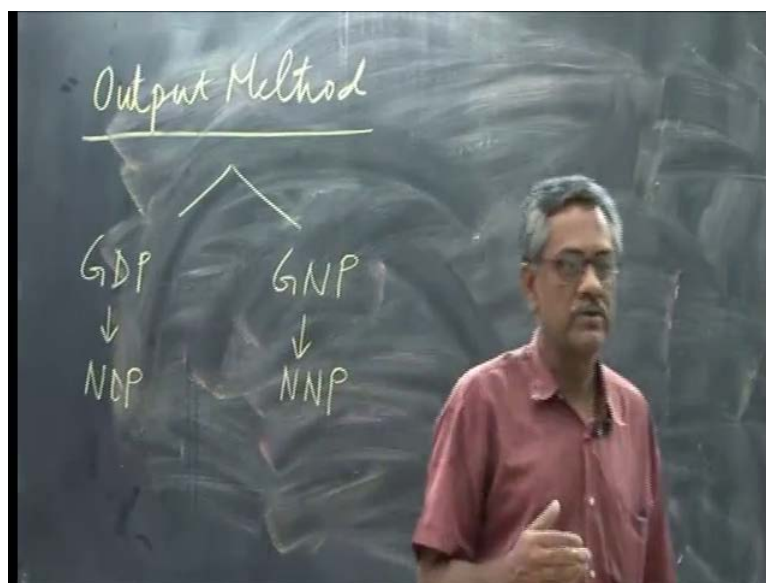
Now let us talk about the output method, under the output method when you use them there are essentially two sets of variables that are measured and very popular in the literature, all of you probably know this. Output method is used to measure one variable called GDP and another variable called GNP you must have heard of these variables, you must have. And GDP there is related variable called NDP and there is a relative variable called NNP, often these two variables are also used. So, these two variables are used, they are very popular using the output.

So, let me explain that to you GDP suppose, I want to explain GDP first using the output method. The full expanded form of GDP is gross domestic product and GNP is national gross national product and NDP is net domestic product, not gross, net and NNP is net national product. Now using the output method basically means, you looking at trying to count the value of the total output produced in India, for instance and the GDP. As if you visit every factory and get the total value of output of goods. So, now suppose you take GDP what it says? GDP is the value of, you may like to take note GDP is the value of, GDP is the value of all final goods and services. GDP is the value of all final goods and services.
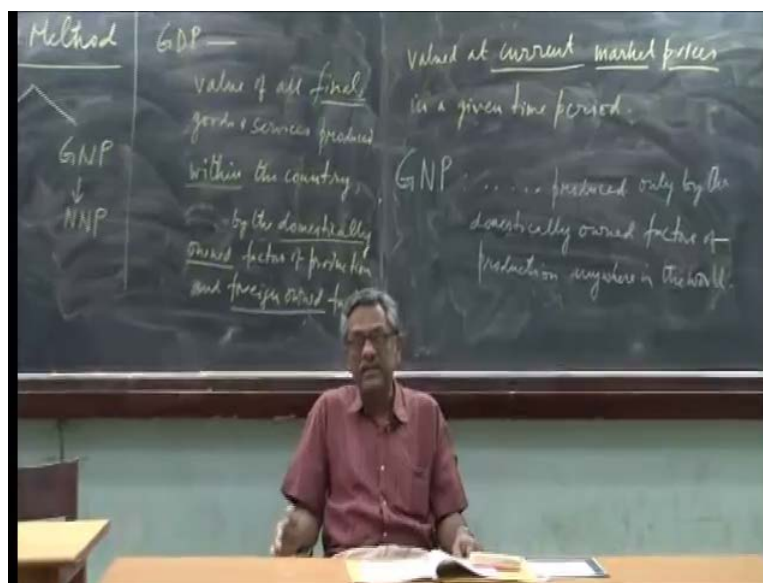
GDP is the value of all final goods and services, value of all final, very important final goods and services, but how you get the value of final goods and services? One is a chair, one is a table, are you saying 100 maruti Zen, 200 plus 200 maruti Suzuki, maruti alto, 500 ford icon, 1 million chairs, 2 million bicycles, you cannot add them. So, they have to be valued using some common denominator and usually the common denominator is the market price. So, the final goods and services, value of all final goods and services which is very important produced within the country, this is very important either by the domestically owned factors of productions or.

No, let me put this way within the country by the domestically, forget about the either, by the domestically owned factors of production and foreign owned factors. Then, valued at current market prices, current underline in a given time period. Usually it is the financial year, the given time period usually is the financial year. So, it can be domestically owned factors of production and foreign owned factor of production, within the country, final goods underlined, valued at current market prices. These underlined words are very, very important, look how it is valued, at current prices in 2012-13 present financial year 2012-13, it starts at 1st of April over year ends and the 31st of March of the following year.

Usually this variables as a financial year denomination, economic variables how much is produced at various stages in the crises prevailing in this time period, that adding up is

very easy. You are not adding the apple and oranges, they are all in rupee value. So, in rupee value you count, but it is important to know not only within the given time period they are produced, their values are current market prices. But also they can be produced by us Indians or if Microsoft opens a companies and Americans are working in here or if it is a Microsoft company may be hiring Indian people. But using labor service, local labor service which is a foreign company which is producing something, also part of GDP, remember that.

Foreign companies are also part of it, whatever they are producing in India, GDP. Now, GNP in this connection, GNP is only slightly different GNP, GNP is only slightly different. GNP says the same thing, but produced only by domestically owned factors of production anywhere in the world, that means both within and outside the country. That is both within and outside the country, Indians may be producing something either in India or outside and that is GNP everything else is the same. So, if you know the output of the India Company in middle east should be part of the Indian GDP sorry, Indian GNP, but GDP is different.

GDP is saying within in India, within the geography you must have seen in map. So, within the geographical boundary of the country whoever is there, either Indian or foreigner producing something, it is part of Indian GDP but if you go outside the country then, it becomes more clumsy. The GNP there to help you then, you take only Indian what they are doing, you are not concerned about any foreigners. So, at one point when the data used to come I remember, Japan is such a tiny country, you can now tell me, if you one take the Japan GNP and GDP value, they used to markly different. Indian GNP, GDP value I have seen how different they are, they are not much.

But Japan's GNP and GDP value markly different, can you tell me which one was bigger? GNP, they have factories all over the world, such a tiny country is one of the richest country, how is it? They have factories all over the world, compared to how many factories foreign companies are there inside Japan, such a tiny country. If you look at how many Japanese countries are there everywhere it is unbelievable. So, this is the first difference. Now the other major features of it, I need to explain I need time yes, I can take one question.

Student: There are so many prices which price is considered in the price level?

You take an average price or at the time of the production the price, those are minor issues not big issues forget about it. If you become the ((Refer Time: 1:23:12)) you have to count the numbers, then you can find out what is doing it. Basically the market price has to be taken, current market prices because there is variable coming out which does not use current market price with respected to GDP, GNP coming to that. Those are very small issues, those are not big issues those suggestions decide which one to take, average price. In India prices differ all over the country, there are many such issues do not get into that, integrity.

Broad consensual frame work I was supposed to tell you here, if you want to know more details, you have to go to CSO there is the organization in Delhi called central statistical organization which crunches the numbers. You can go to them and find out what they do [fl], they will tell you which one they take. It differ because of various taxes they have, various state taxes even petroleum prices when they are announced, you noticed petrol [fl] price everywhere there is different price, same product same country. So, do not get into those issues [fl] what is important is that, it has to be within a particular time period valued at market price and coming to the market price business more. And what I mentioned earlier is the final goods and service this is the horrendous part.

So, you are talking about GNP, GDP the goods, that are final goods, what are final goods? Goods that consumers can use so, you are talking about pots and pans, but not steel sheets. But suppose when you are connecting data, you take the steel plant output value in a year and then the steel plant output goes in various forms, steel sheets, steel pipes whatever into various industries as intermediary product, which are not final product. They will take some final shape there and become a car or can become a box, can become pots and pans can be something, which consumer could use. Then you have to make sure that, the intermediary products values are deducted from the final market price value or goods or output.

Because, the final market price value of the output, pots and pans etcetera, the cars according to the common valuation process method, they will cover all the cost that are going into it and the taxes and the profit margins of the producer, organizers. But all the cost also include the intermediary cost goods, the cost of inter mediatory goods that have come in semi finish goods, that have come as inputs from various other industries aluminum industries, steel plants, rubber factory, whatever. Nuts and bolt etcetera

whatever they have come, they have all gone into making the final price of the car. So, all intermediate products have to be deducted.

So, essentially therefore what you are talking about in this output approach etcetera is that you want to take the value added at every stage of production, there are various stages of production. First is the raw material in the mine ores, when they are owed mined, they take some, acquire some value when they reach the steel plant. From the steel plant when they reach the automobile factory, they acquire more value of that.

So, essentially output method what you are talking about the value that is being added at every this stage, but in simple form if you take the final market price as the definition says, then you have to make sure double counting. Because, if you have already counted the intermediates, but if you go straightly by the definition, a final goods then you have not counted intermediary goods output or data collector to the steel plants, to find out the steel output. And then, you have send to the automobile factory to the pots and pans factory, to the bicycle factory, to get the final output. You have to make sure you do not do double counting, it is called double counting, and you do not doubly count these things, alright. You do not double count these things.

So, essentially what they are looking into the philosophical basis of this is the value added at every stage, for well in this case reaches the final stage, you are looking into the final value added on top of all the values added. If you add them up and the final value added you get the total value of output produced in the country. Or if you do not want to get into the value added counts it is more confusing, if you did the final market price of the final goods. Like this table I am using, you make sure you do not take the intermediary good stages where, it was a simple log first, it was the simple plant, a tree then it was cut and brought over to log factory and it was given the shape of a wood.

And some value added when you sold to the carpenter then, the carpenter added some value and gave it shape, polished it, used the nails and made it a table which is finally, sold to you, alright. So, you make sure you do not have intermediary goods data collected, and then also the final goods data collected then, you would be doing a double counting. So, double counting is a very important issue beside the issue accurate about which price to take, which is not simpler, you take an average price, [FL] you take the end of the price. You take the middle of the year price, you take the price when it has

finally, and left the factor for the market you take that price, right. There will be errors statistical measures always have errors, but the conceptual part is more important. So, all final goods are to be taken into and produced within the country, alright?

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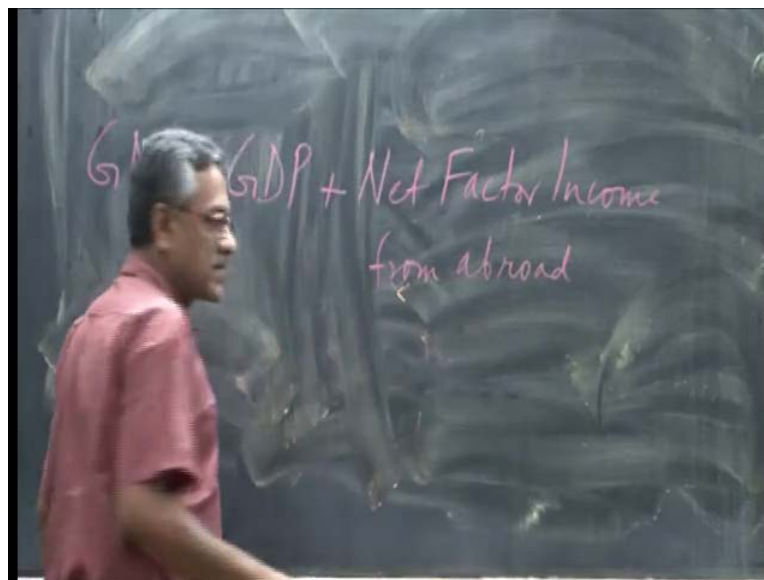
What they do they quickly say this following thing, GNP is equal to GDP plus net factor income from abroad, net factor income from a abroad. Now what happens when an Indian company goes out and produces, it is part is their GDP Indian Company producing in Kuwait, part of Kuwait's GDP. GDP says you take all foreigner and Indian and domestic companies there, all output [FL] which should be the part of Indian GDP is often not known to the India government, if it is private company for instance. Only that part is known when he that company is remitting, sending back some of the income here. It can be the Indian workers they are sending back, it can be the companies, the bosses sending back, the company itself remitting funds sending back to the deposited.

If he, if that company is putting money there, receiving money income there and depositing them into international banks, or in the local banks, whatever it is not known to the Indian government, it is not known to the Indian ((Refer Time: 01:31:31)). Huge problem to count the output that is produced outside of the country [FL] within the country it is so difficult to get the output. I am coming to that in India, but for any decent country even if it is very difficult to get the numbers what they are doing outside, unless they are remitting.

So, this is called factor income, now imagine foreign companies in India who are producing are also remitting back home, some income. Indian companies working out in Kuwait, in Africa in Europe, in south east Asia wherever remitting back some income they are generated to India back home, is recorded then, when they are coming to the banks etcetera. So, what they are doing for the practical purpose of computing the value of GNP, they are taking the GDP value which is easy to compute because which is within India. Indians can seat here and get the data, whatever the good data you can get, the foreign component where it is in GNP when Indians are outside and no Americans and English men should be in GNP, that would be deducted. They take a net factor income, value [FL].

And that what they call the net factor income and then say Indian GNP value is this. So, conceptually they cannot follow and have a perfect number for GNP, they are trying in real life, in practice they are trying to get an approximation of Indian GNP through this net factor income variables, which is having a plus and a minus term, the plus term is when Indians are sending back income, that is the plus term. And the minus term is when the foreigners are sending back income to their country from India after earning here that is a minus term. So, plus and a minus [FL] it can be a plus number, it can be a minus number who knows, the net factor income from abroad can be either plus number or minus.

There is no theoretical restriction ((Refer Time: 1:34:04)) on numbers, on the variable sign, but that they will add if minus number is added to GDP then Indian GNP number will be lesser GDP. If a minus number, in case of Japan I was trying to say it is a huge plus number. So, Japan's is GNP bigger than GDP, I was trying to tell you that, but in fact is, this is what they are doing, are you clear, everybody? GNP, GDP these are very common variables, part of economics course. In future it may not have any scope to take another economy, alright. So, we close the lecture at 12 today.