Lectures prepared for course – HUM 275 (Economics)
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Measurement of National Income

To understand the economic performance of a country we need to know the national income of a country. Statistics of national income enables the policymaker at different level to judge whether the economy is at a static position or contracting or expanding. When economists want to determine the level of development of a country they look at its per capita income. Data of national income helps policy makers to steer the economy towards the key economic objectives.

There are several measures of national income such as "Gross Domestic Product (GDP), Gross National Product (GNP), Net National Product (NNP) and many more. But most widely used measure of national income is GDP.

GDP is the total **dollar value** of the all **final goods and services** produced within a **nation's territory** during a **given year**. Please note each and every bold word of this definition. GDP is the most comprehensive measure of a nation's total output. It is the sum of the dollar values of consumption, gross investment, government expenditures of goods and services and net export produced within a nation during a given year. If we can sum all the above mentioned expenditure then we can actually calculate the GDP. We can express this definition as

Y = C + I + G + NX

Here,

Y = GDP

C = Consumption Expenditure

I = Investment Expenditure

G = Government Expenditure

NX = Export (X) – Import (M)

Or in short

GDP= $\sum_{i=1}^{n} Pi \,.\, Qi$

Example: Suppose, in 2015 country A produces 10 Kg. rice (price is 30 Tk.), 20 apple (price per apple is 5 Tk.) then GDP of the country in 2015 will be

GDP of country A= Price of rice x Quantity of rice + Price of apple x Quantity of apple

= 30 x 10 + 5 x 20

= 300 + 100

= 400 Tk.

There are two ways of measuring GDP.

Nominal GDP: Nominal GDP is calculated using current market price. Example: price of rice in 2015 will be used to calculate the nominal GDP of 2015. Nominal GDP can increase if price increase or quantity increase or increase in both.

Real GDP: Real GDP is calculated using base year market price. Example: Suppose base year is 2010. Price of rice in 2010 will be used to calculate the real GDP of 2015.Real GDP can increase only if quantity increases. There is no chance of change in price because only base year price is used to measure real GDP.

Example of nominal and real GDP is given below:

Nominal GDP:

Following table represents the calculation of nominal GDP for year 2014, 2015 and 2016.

Output	2014			2015			2016		
	P_{14}	Q_{14}	$P_{14}Q_{14}$	P_{15}	Q_{15}	$P_{15}Q_{15}$	P_{16}	Q_{16}	$P_{16}Q_{16}$
Rice	10	20	200	15	20	300	10	40	400
Apple	5	50	250	10	20	200	10	60	600
Car	100	3	300	100	3	300	150	3	450
Total			**750TK**			**800TK**			**1450TK**

In calculation of nominal GDP current year price is used. Here we can see that the nominal GDP is increasing every year. This rise in nominal GDP is led by both change in price as well as change in quantity (output).

Real GDP:

Following table represents the calculation of real GDP for year 2014, 2015 and 2016.

Output	**2014 (Base Year)**			**2015**			**2016**		
	P_{14}	Q_{14}	$P_{14}.Q_{14}$	P_{14}	Q_{15}	$P_{14}.Q_{15}$	P_{14}	Q_{16}	$P_{14}.Q_{16}$
Rice	10	20	200	10	20	200	10	40	400
Apple	5	50	250	5	20	100	5	60	300
Car	100	3	300	100	3	300	100	3	300
Total			**750TK**			**600TK**			**1000TK**

In calculation of real GDP, base year price is used. We know real GDP rise only when output increase and real GDP falls as output falls. Here 2014 is considered as the base year. In 2014 real GDP is 750Tk and in 2015 it is 600TK. So real GDP falls in 2015. But in 2016 Real GDP rises only because of increase in output of that economy.

Growth rate of Nominal and Real GDP:

From the calculation of nominal and real GDP, growth rate is calculated. Growth rate is the percentage Change (increase/ decrease) in GDP from one year to next.

$$\text{Growth rate}=\frac{Y1-Yo}{Yo}\text{ x100}$$

Year	Nominal GDP	Growth Rate of Nominal GDP	Real GDP	Growth Rate of Real GDP
2014	750	-	750	-
2015	800	$\frac{800-750}{750}\ x\ 100$ =6.66%	600	$\frac{600-750}{750}\ x\ 100$ =-20%
2016	1450	$\frac{1450-800}{800}\ x\ 100$ =81.25%	1000	$\frac{1000-600}{600}\ x\ 100$ =66.66%

From the above calculation following comments can be made:

- In 2015 nominal GDP is growing at a rate of 6.66%
- But in year 2016,growth rate of nominal GDP is 81.25% which much larger than the previous year 2015.
- As we know that growth of nominal GDP can mislead us about economic performance we need to focus on growth rate of real GDP
- In 2015 growth rate of real GDP is negative (-20%). That means output has decreased in 2015 compare to 2014.
- But in 2016 growth rate of real GDP is 66.66%. That means output has increased in 2016 compare to 2015.
- It is worth noting that in 2015 growth rate of nominal GDP is positive (6.66%) but growth rate of real GDP for that year is negative (-20%). So if we consider nominal GDP we would conclude that the economy is performing good but real GDP depicts the actual picture that the economy's performance is not god in 2015 because of negative growth in real GDP.

Relationship between inflation and unemployment:

Inflation is the persistent rise in price level. We know that this rise in price level can be a result of demand pull or can be an event of supply shock known as cost push inflation.

It is important to note that in an economy price plays a vital role. Different economic agent perceives it differently. If we analyze a demand pull inflationary situation, it reveals that as price goes higher, with every higher level of price output also increases (figure reference: demand pull inflation). Now it is also interesting to relate higher level of output and employment level when there is inflation. For every output level there is an employment level. If the economy is going to produce more then it will need more workers, which in turn implies employment level will increase. At also express the same idea if we say that unemployment level will decrease. Employment and unemployment is just opposite side of the same coin. If one increases then other decreases.

This discussion has several important points to note. First, inflation is not preferred by the general people. Because inflation means, with same amount of money you can now purchase less goods and services or to buy same amount of goods and services now you will need more money. Second, employment is preferred by general people. If there are more jobs / less unemployment in the economy people appreciate it. When we add these two points we have an economic interpretation of the relationship between inflation and unemployment. We see that it is not possible for us to have low inflation and low unemployment level simultaneously. Unemployment level only falls if there is a rise in inflation. This is the tradeoff between inflation and unemployment which is also termed as “Philips Curve”

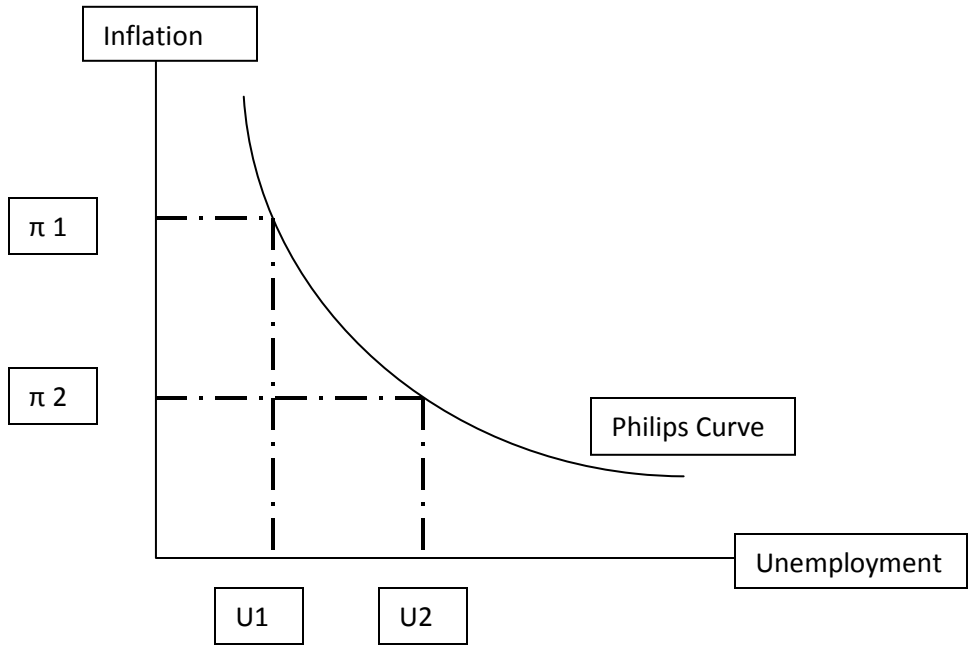

Figure: relationship between inflation and unemployment

From the above figure we can see that as inflation goes up unemployment level goes down.