

Problems in Measuring Economic Development

Kishore G. Kulkarni, Ph.D.

Department of Economics, CB 77, P. O. Box 173362,

Metropolitan State College of Denver,

Denver, CO 80217-3362

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Introduction:

Just like a firm keeps record of the progress it makes over the years, an economy maintains its record of performance by the national income accounting. It is important for an economist to know how the economy is doing, because several policy steps depend upon the economic performance. For example, even the social security checks payable to elders are tied to cost of living index (COLA). The economic growth rate can change the cost of living for all of us. So, the main question is how do we keep a track of economic performance? How do we define the economic development? Are there practical problems in such record keeping?

These questions have bothered economists for a long time and there are some theoretical and practical answers to these questions.

Section 1: Measurement of Economic Development

The theoretical definition of economic development involves the explanation of Production Possibilities Curve (PPC). PPC is the locus of combinations of two goods an economy can produce by using all its resources. Consider Figure 1 and assume that

economy produces only 2 foods, Good X and Good Y. The quantities of these goods are plotted on X and Y axes respectively. The curve shows all the possible combinations of good X and Y that can be produced by using all resources (or the stocks of all factors of production) in the economy.

Figure 1

Production Possibilities Curve (PPC) and Measurement of Economic Development

Points inside the PPC show those combinations of goods which when produced leave some resources unused. They also therefore represent conditions in developing economies which usually struggle to have all resources fully used up. Hence points such as points H and F, show the conditions in underdeveloped economy. The process of

moving from points H and F towards the points on the PPC would make using more resources and hence that process is called economic development. Hence on theoretical level economic development involves using more resources and making a movement towards full employment of resources.

This paper also aims to calculate the economic development with the help of National Income Accounting, which involves calculating the Gross Domestic Product (GDP). So, GDP calculation serves two purposes: First, it is a measure of economic development and second, GDPs of two or more economies can be used for the comparison of developments in those economies.

The US Department of Commerce which keeps a record of US economic performance, published Gross National product (GNP) figures until 1991 in stead of GDP as it does now. In macroeconomic terms, “Y” is the letter reserved for denoting GDP. However before progressing further, we need to point out the differences between GNP and GDP. While GDP measures the value of all final goods and services produced in a country’s territory irrespective of the ownership of the entity producing the good or the service, GNP measured the value of all final goods and services produced by US owned entities irrespective of their location. Hence for USA’s GDP, value of production of all final goods and services in the US territories will be included irrespective of the ownership of the companies. Hence production by Toyota plant in Mississippi will be included in US GDP but not in US GNP. This is because Toyota is a Japanese owned firm, and GNP measure did not include value of the production by non-US owned companies. In the

similar way value of the production of IBM plant in Mexico City will be included in the USA's GNP but not in GDP, because Mexico City is not a part of US territory. However, if comparisons of the GDP and GNP are done, then it is clear that for USA, the numerical differences are insignificant. This is partly due to the fact that US GDP is so large. We shall re-visit this point in future discussion.

The theoretical definition of GDP therefore can be summarized as the "total market value of all final goods and services produced in an economy in a given time period", usually that time period is one year. Two key concepts in the above statement are i) Final goods and ii) market value. Final goods are those goods that are used for final consumption or the ones that directly satisfy wants. Examples of final goods include, apple juice, cars, gasoline, most of the grocery store items and houses. These goods give the consumers satisfaction from consumption. Final goods therefore are sometimes called, "consumer goods". As against the final goods, there are intermediate goods that are used in the production of some other good/s. Examples of intermediate goods include such things as rubber, plastic, machines, basic metals and wood. Because intermediate goods' value is already included in the value of final goods, they are excluded from the GDP calculation to avoid their double counting.

Market value of any good is the price of the good times the quantity produced. This is because the market value of 10 cars would be \$200,000 if each car is priced at \$20,000.

Hence

Market value of a good = price of the good x quantity produced.

If we do this calculation for all final goods and add up all market values, then the total market value of all final goods should be the GDP of an economy. This GDP is labeled as “Nominal GDP” and as you can see, the value of nominal GDP can be easily changed if there is only a change in price/s of the commodities. For example if only prices go up (And the quantity produced stays the same) then market values will go up and then nominal GDP will go up, creating a problem for us to conclude that economy is developing when only prices are increasing in it. To avoid this problem of the effect of price changes on the nominal GDP, economists construct Price Index.

Price Index is constructed by comparing the prices of current year (the year for which the price index is constructed) with the prices of same goods in base year (the common year used for comparison) and by taking the following ratio:

$$\text{Price Index} = \frac{\text{Average price level of goods in current year}}{\text{Average price level of same goods in Base year}} \times 100$$

Now the question is which goods should we include in price index calculation?

Depending upon the answer to this question we can define 3 major price indexes. 1)

Consumer Price Index (CPI) It is defined when only final goods are used for Price index calculation, hence CPI gives us the idea of the change in cost of living of the consumers

from base year to the current year. 2) Producer Price Index (PPI): It is defined when only intermediate goods are used in the Price Index calculation. In fact in some old books you may see Wholesale Price Index as another name for the PPI.

PPI therefore measures the changes in cost of production of the goods from base year to the current year. 3) GDP Deflator: This is the broadest type of price index because it includes all types of goods in Price index calculation. Hence, GDP deflator is the most comprehensive price index, it measures changes in prices of all types of goods. There are basically 3 major uses of Price Indexes calculated in this manner.

- a) To define $\text{Real GDP} = (\text{Nominal GDP} / \text{Price Index}) \times 100$. The real GDP is conveniently defined as the ratio of nominal GDP and price index (multiplied by 100) to avoid the effect of prices on the value of GDP. Hence if only prices go up, the price index will go up, nominal GDP will go up and the real GDP may stay the same. Thus any increase in prices alone will not make a change in real GDP. In fact in macroeconomic theory we traditionally separate the nominal and real variables by deflating them by the prices. For example money wage/ prices will be real wage. By defining real GDP we have now avoided the effect of prices on GDP.
- b) Any one of the price indexes will be used to measure the “General Price Level” (P) of an economy. So, whenever a question of “how do you measure the price level of an economy?” arises, the answer usually is by one of its price indexes.

- c) A percentage increase in general price level is popularly called inflation rate of the economy. Hence the 5% increase in general price level is the 5% inflation rate in the economy. Price indexes therefore have varied uses.

In reality however, Department of Commerce does not calculate GDP by taking the surveys of the whole economy and by calculating the actual market value produced by each and every firm. In fact there is no way to contact each and every producer to inquire about the production he/she has made in a given month or a year. Hence in practice we have to make adjustment for the calculation of GDP. There are 2 approaches used for actual expression of GDP: 1) Total Expenditure or Aggregate Demand Approach and 2) Total Income or Aggregate Supply Approach.

In aggregate (aggregate only means “total”) demand or total expenditure approach we approximate that total expenditure generated by all sectors in an economy is the GDP of that economy. The argument here is that if someone has spent in buying certain goods, they must have been produced, so value of any expenditure should be included in the GDP of the economy. Therefore, in this approach, we define

$$\text{GDP} = \text{Total Expenditure generated by all sectors of the economy.}$$

In any economy there are 4 major sectors that can generate expenditure: a) Consumer Sector b) Produce Sector, c) Government Sector, d) Foreign Trade Sector.

- a) Consumer sector is usually the largest sector of the economy, it generates roughly 65% of the total expenditure in US economy. There is a vast expenditure carried out by consumers on final goods and services, and that expenditure is called “Consumption” and it is represented by letter “C”. Therefore consumption represents the expenditure of the consumer class on final goods and services on such activities as buying groceries, gas, shopping, houses, clothes etc.
- b) Producer Sector has some special expenditure on purchase of machinery, tools and equipment or on construction activities or on the production of goods that are not yet sent to the market (popularly called inventories). This expenditure of producers on these activities in macroeconomic terms is called “Investment” and is represented by “I”. The term “Investment” therefore has more than one meaning. When you tell your friend you are investing \$100,000 in the purchase of IBM stocks that investment refers to the financial investment and it is not a part of “Real” or “macroeconomic” meaning of investment. The real investment only includes the three activities we described above. Financial investment such as the purchase of bonds, stocks, shares, precious metals etc is important, but it is not a part of “Macroeconomic” meaning of investment. In case of US economy, gross domestic investment constitutes roughly 20% of the total expenditure and it is the most volatile part of total expenditure. It ranges from 17% to 22% and its fluctuations are very important to make changes in GDP as we shall see in later chapters.

Government Sector has expenditure on several activities such as welfare payments, defense expenses, paying off the interest on the national debt, education, transportation,

national security, national parks and recreation, maintenance of police force, prisons, housing and urban development and many other activities. All this expenditure by the government sector is called, “Government Expenditure” and it is represented by “G”. In case of US the expenditure has increased slowly in last 50 years. In 2008 for example US government will spend as much as \$2800 billion After discussing the ways to calculate GDP and its components, we should now ask the question, “Is it worth doing all this circus and spend resources in calculating GDP?” Some economists, skeptical about the whole process of calculating and publishing GDP related figures, answer this question with a big “NO”. In fact a group of economists, led by a former professor from Harvard University, Oskar Morgenstern believes that the whole process of GDP calculation is Garbage-In-Garbage-Out (GIGO) process, because it leaves out so many important calculations and has quite a few limitations.

We can summarize these limitations of GDP calculation here as follows:

- 1) First limitation of GDP serving as the measure of economic development is that the GDP calculation process does not consider the population of the economy, it only considers the production value. If we want to get the real measure of economic growth, we not only need to know the production produced but also have an idea of how many people are using that product. The real economic development occurs not just by higher production but also by few people having more production produced. Consider for example the GDP of an economy such as India. India produces one of the top 10 largest GDPs in the world. So if you look at the GDP alone you may conclude that India is the 10th largest developed country in the world. But that conclusion can be misleading.

Because even if in 2008 India's GDP is roughly 1 trillion dollars (with out considering its purchasing power) when one considers India's population of 1.1 billion, its Per Capita Income (PCI) is roughly 950 dollars. Ranked according to the PCI, India's rank is more logically close to 122 out of roughly 200 countries in the world. Hence if GDP measure has to be an indicator of economic development, then it should consider the population of the economy, or to put differently, PCI is a better measure of development than GDP itself. Recall that $PCI = GDP/Population$.

2) Another limitation of GDP calculation is the fact that GDP does not consider "non-market" transactions which are the representatives of production activities that should be a part of GDP but are not. These are therefore such productions that are produced but are not sold in the market mechanism and are therefore never valued. Consider for example such production as say the backyard gardening. When your friend has a garden of vegetables and he/she gives you some of his crop, and if you do not pay him/her for that gift, then the production has taken place but there is no "marketed" exchange of that production, and therefore there is no value to that production that can be included in the GDP calculation. In reality we can consider several other examples of Non-market transactions. Some examples can include painting your own house (as against getting it painted from a company to whom you will pay) or doing laundry at home (as against from a professional cleaner). Now compared to developed economies, developing countries have many more non-market transactions. In fact consider the fact that per farmer land holding in USA is roughly 550 acres while per farmer land holding in Bangladesh is only 2.5 acres. Hence for Bangladeshi farmer, agriculture is essentially a

backyard gardening which his/her family uses for the whole year. Of course this type of production is neither valued nor marketed and therefore is not counted in Bangla Desh's GDP. So our conclusion is that GDPs of Less Developed Countries (LDCs) are usually underestimates of their actual production due to the exclusion of non-market transactions in GDP.

3) Third problem with GDP calculation is the inability of this method to include the bad-side effects of the higher production. The bad-side effects are called, "Externalities" or "Diseconomies" of higher Production. For example, when an economy produces a lot of cars, it obviously increases its GDP figure by a large number but the large number of cars can add to the pollution and make the air dirty. Dirty and polluted air is an excellent example of "bad-side effect" of higher production. Similarly higher chemical production can make the firm dump the residues in the river and river pollution is another negative externality. Another example of negative externality could be the danger of radiation leak. In 1979 in Three Mile Island area of Pennsylvania, there was a great panic with the potential of radiation leak from the nuclear plant. Of course, people living there have this negative externality of fear of radiation.

(As one can argue in reverse, there are some positive externalities (or good side effects) of higher production too. For example when a big departmental store is opened in your neighborhood, you will get to use newly paved and expanded roads. This may add to the GDP some extra value too. But here we can make our point against GDP calculation by concentrating on the negative aspects of externalities). If GDP has to be a reliable measure of economic development, then value negative externalities should be subtracted

from GDP value. Clearly the GDP in its present form does discount the values of externalities, hence there is a limitation to use it as a reliable measure of economic growth.

Two attempts were made by some great economic researchers to overcome this problem. First, Prof. Paul Samuelson (retired Professor at Massachusetts Institute of Technology (MIT) and a Noble prize winner in Economics) has proposed a new measure of economic welfare called, Net Economic Welfare (NEW). NEW was set by considering all the negative values for externalities. Similarly, two Professors from Yale University (both Nobel Prize winners too), William Nordhaus and James Tobin proposed another measure called, Measure of Economic Welfare (MEW) which was supposed to do the same thing as NEW to adjust all countries' GDPs. However, neither New nor MEW became very famous partly because the externalities are so subjective concepts and giving them monetary value was considered to be an abstract and arbitrary exercise.

- 4) Another problem with GDP calculation is the inability of this measure to recognize the difference between “what is” produced and “how much” is produced by an economy. While GDP does a good job of measuring how much is produced it ignores what it produced by an economy. In reality there can be an economy which uses many of its resources to produce a lot of what is socially is not very desirable. For example if there are two countries, say Country A and Country B, with GDP figures of \$500 and \$700 billion respectively, then just by looking at GDP we shall conclude that Country A is not as developed as Country

B. But if Country A's production is mainly in all the necessities such as food, shelter and clothing related goods and very few luxuries such as big yachts, racy cars, and other luxurious items then Country A's production is socially desirable. If country B is doing the reverse, and has more production is luxury goods and only few necessities are produced, then the social desirability is questionable despite the higher GDP. Would you consider Country B more developed than Country A in this case? So, the point is that higher GDP does not necessarily mean higher economic development if we do not know what is produced by the economy.

- 5) Another problem with GDP calculation is not considering the distribution of the production. For a complete idea of economic development we need to know how the economy is doing in terms of taking the higher production and prosperity to all classes of people. If one country despite its higher production of goods and services is letting its large poor population starve, and if the small minority of very rich people in it, is taking a larger share of its GDP then that country should not be considered very developed. Similarly if another country is doing a great job of distributing its GDP to all levels of its population then it should be considered better developed despite its lower value of GDP.
- 6) Add to the above major limitations of GDP to serve as the measure of economic development, other practical problems such as discrepancies in collecting data, doing surveys, getting reliable information and administering the quarterly (if not yearly) projects to do all this statistics. There is a question of how to solve the problem illegal transactions some of which may not be immoral, that will not be

included in GDP. To evade taxes many times transactions in many countries are not recorded, even though they are legal and moral transactions. This exclusion creates even higher difficulty for GDP to serve as a good measure of economic growth. These practical problems would significantly add to the skepticism that some economists have for GDP calculation. No wonder then some analysts want to abandon the whole exercise.

Nonetheless, as we know almost all countries (even communists and dictatorial countries that strictly control many of their economic variables) publish monthly, quarterly and yearly data on GDP. All member countries of International Monetary Fund (IMF) have their data printed in famous publication of International Financial Statistics and other numerous publications. So, why don't countries listen to Prof. Morgenstern and his friends?

A simple answer to that question is that there is no more suitable, more reliable, and a better substitute for GDP anyone has yet found out. Some attempts are made by the World Bank to come up with such measures as Human Development Index (HDI). There is also a re-calculation of GDPs according to purchasing power of the money to solve the problem of one dollar buying more in developing country such as in India. These attempts however have not become very popular and universally acceptable. So our conclusion is what most of the economic (and statistics) profession agrees upon. It is the feeling that we need to remember all the limitations of GDP calculation and take these figures with some grain of salt. But the uses of GDP are so

many and so far fetched that we cannot just throw away its universal acceptability for minor problems in its expression.

All in all we are left with economic development that is defined in an obscure fashion and measured in even more controversial manner. Other attempts such as Human Development Index are also some what useful but they also have the problems of collecting data and reporting the correct figures.

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