

**Macroeconomics
For
Professionals, Students and Investors
A Non-Technical Course**

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FOREWORD

Macroeconomics

Understanding macroeconomics (which is a field or branch of economics that studies the behaviour and economic performance of the economy as a whole) has become a necessity or a compelling imperative for professionals, students and investors across the globe, due to rapid/bewildering changes in the economic environment (in developed and/or developing economies and the global economy), rising economic instability (in the post-global financial crisis world) and growing influence of economic factors on business conditions/environment, corporate growth strategies and earnings and financial, investment, marketing, sales, strategic, economic, savings and consumption related decision-making.

Unfortunately, macroeconomics is often considered a difficult, theoretical, highly technical/mathematical or complex subject by many professionals, students and investors. Consequently, despite their best endeavours, many in the aforesaid audience often find themselves ‘overwhelmed’ and not being able to ‘make sense’ of or adequately comprehend the **rapidly changing economic environment and economic factors driving such change**. Further, they are often unable to clearly grasp or better understand what economists, policy makers and media have to say on **substantive ‘real world’ economic issues** such as GDP growth, inflation, unemployment, interest rates, exchange rates, recession etc. Moreover, many who have some background of macroeconomics find it difficult to relate this field of economics to ‘real world’ economic developments or comprehend such developments, due to having acquired knowledge of macroeconomics which is probably too theoretical, abstract or voluminous.

To facilitate or make easier the understanding of macroeconomics, so that one can start to ‘make sense’ of the rapidly changing economic environment and comprehend ‘real world’ economic developments, we have designed this short online (180 hours) course – **‘Macroeconomics for Professionals, Students and Investors – A Non-Technical Approach.’** This course does not require an understanding of mathematics. The endeavour has been to provide knowledge of macroeconomics that is more practical or useful, rather than voluminous and unnecessarily theoretical, so that one can relate such knowledge to ‘real world’ economic developments/trends and most importantly use it to start comprehending or performing intelligent analysis of the economic environment and rapid changes in the same.

The distinguishing feature or aspect of this course is that it focuses primarily on economic issues related to the short run, rather than on long run economic growth and development. This is because professionals, students and investors and firms across the globe are usually most affected or impacted by rapid changes in the economic environment, short-run fluctuations in economic activity in their respective economies and the global economy, day-to-day economic developments and rising economic instability (which is being reflected in more volatile growth rates, inflation rates, exchange rates and interest rates in the short run).

Every attempt has been made to give just enough or sufficient knowledge of macroeconomics required to **better understand the rapidly changing economic environment and ‘real world’ economic developments**, rather than give unnecessary material that can make learning very cumbersome and leaves one none the wiser. We at ‘Macroeconomics School’ do sincerely hope that going through this course is an enriching experience for you.

Gross Domestic Product

We wish to focus and draw your attention in this module to the key macroeconomic variable or indicator - known as **Gross Domestic Product (GDP)** - which is the primary and the most comprehensive or broadest measure of macroeconomic performance or the state of an economy and represents the market value of total output (i.e. all final goods and services) produced in an economy during a given or specific period of time (typically a quarter or a year) i.e. GDP is a comprehensive measure of the total output of final goods and services produced in an economy during a given or specified period of time. Further, it is usually the official measure of a country's economic output.

It might be pertinent to mention here that when we refer to GDP in this module and the entire course **we mean real GDP i.e. GDP adjusted for inflation or what is called GDP at constant prices.** Further, GDP is also called aggregate output (Y). Another point worth mentioning at the outset is that when an economy is in a recession it means that GDP has contracted (usually at least for two consecutive quarters) and when an economy is recovering it means that GDP has started to grow again.

Essentially, GDP serves as a barometer of the state of an economy i.e. **the growth rate of GDP informs us of the pace at which an economy is growing, slowing down or contracting** and is also reflective of the soundness of macroeconomic management of an economy. Further, the growth rate of GDP signals the likely direction of overall economic activity in an economy in the coming quarters (i.e. in the short run).

Economists and analysts try to gauge the macroeconomic performance or state of an economy (i.e. is it expanding, slowing down or contracting) by usually comparing quarter (latest)-on-quarter (previous) growth (%) of GDP and year-on-year growth (%) of GDP (i.e. growth (%) of GDP in the latest quarter when compared to the same or corresponding quarter (period) of the previous year). The first comparison provides us with the quarterly growth rate (%) of GDP and the second comparison provides us with the annual growth rate (%) of GDP.

A sustained and high growth rate of GDP (i.e. aggregate output – Y) along with price stability is what policy makers' wish for in any economy and they mainly or usually use two macroeconomic policies (monetary policy and fiscal policy) to attain these key macroeconomic objectives. **Monetary policy involves changes in money supply or interest rates by the central bank of a country and fiscal policy involves changes in government expenditure and/or taxes. Please refer to module 7 on ‘Monetary Policy’ and module 8 on ‘Fiscal Policy’ for more details.** It might be noted that these two policies affect or influence not only GDP and inflation, but also interest rates, exchange rates and a host of other macroeconomic variables.

A very important point worth mentioning here is that macroeconomic policy (i.e. monetary policy and fiscal policy) is primarily focused on aggregate demand management in the short run, as it takes time (over the long run) to enhance the productive capacity (i.e. aggregate supply side) of an economy, and such policy affects both GDP (i.e. aggregate output – Y) and inflation in the short run primarily through its influence on aggregate demand. **At this stage you might not be able to fully grasp this point, however, when you go through module 4, 5, 7 and 8 on ‘Aggregate Demand and Aggregate Supply,’ ‘Business Cycles,’ ‘Monetary Policy,’ and ‘Fiscal Policy’ respectively this point should become very clear to you.**

Having stated the above, an important reason why policy makers are keen to have a sustainable and high growth rate of GDP (along with price stability) is due to its beneficial effect on private investment, consumer confidence (which usually results in higher consumer spending on goods and services), employment generation and household incomes.

For example, if an economy has been growing in a sustainable manner for at least 2-3 quarters due to a rise in consumer spending over the same period (2-3 quarters), firms, once sure of the continuation of such a positive trend, tend to undertake capital investment to cater to increasing consumer demand for goods and services, which results in more people being employed (due to higher demand for labor) and consequently higher household incomes.

Higher household incomes tend to boost consumer confidence and spending, which in turn results in higher investment spending by firms (that leads to more employment and incomes) and consequently higher GDP growth and an economic expansion that is self-sustaining (for a while, until accelerating inflation or rising inflationary pressures, due to continued increase in consumer and investment demand, forces policy makers to slow down the economy through appropriate macroeconomic policy actions (mainly through ‘tight’ monetary policy) or the economy is buffeted or hit by a negative demand side shock (for example, a financial crisis) or a negative supply side shock (for example, an unexpected surge in international oil prices) that leads to an economic slowdown, recession or a reversal of the self-sustaining economic expansion).

Next, the official estimate of growth rate of GDP, which is published quarterly by most countries (a few countries release the official estimate of growth rate of GDP on an annual, rather than on a quarterly basis) is the most sought after and awaited macroeconomic statistic by policy makers, corporate world and financial markets, as it provides them with key information pertaining to the state of an economy and where it is likely to head in the near future (i.e. in the coming quarters). Such information is very important for policy making, macroeconomic management, business/commercial/financial/strategic planning and decision-making by firms and financial investment decision-making by investors, due to the fact that growth rate of GDP has a potent influence on four important variables in any economy - **interest rates, inflation rates, exchange rates and corporate profitability** – which influence overall economic activity, business confidence and investment activity, stock markets and bond yields.

Let us give you a small example of how growth rate of GDP has a potent influence on the aforesaid four variables.

Let us take the example of an economy that has been experiencing several quarters of strong growth (i.e. strong GDP growth) – accompanied by strong growth in corporate profitability - due to which capacity utilization across varied sectors of the economy is very high (around 85% or more), and the official estimate of quarterly GDP growth for the latest quarter (for which such data is available) also showing that the economy continues to grow very rapidly.

Such an economic scenario is likely to lead to **higher inflation and elevated inflation expectations** in the near future (as the economy’s capacity to expand output further in the short run is limited). This in turn is likely to result in a **rise in domestic interest rates**, which tends to dampen private investment (and **corporate profitability**) and consumer spending (due to higher cost of borrowing for firms and households) and consequently leads to higher unemployment in the near future.

Further, a rise in domestic interest rates is likely to result in an **appreciation of the domestic currency** vis-à-vis foreign currencies (i.e. **currency appreciation**) that will tend to dampen export demand (as domestic goods will become more expensive for foreign residents). Moreover, a rise in domestic interest rates will lead to a fall in bond prices (as they are inversely related) and also adversely affect house prices and stock (share) prices.

Due to all these reasons, the economy is likely to witness weaker growth or an economic slowdown (i.e. weaker or lower GDP growth) in the near future.

Once the economy witnesses an economic slowdown or weaker economic growth, domestic interest rates tend to fall as inflation goes down. Further, as a result of the economic slowdown, corporate profitability falls further. Moreover, due to falling domestic interest rates there could be a significant capital outflow from the country (as foreign investors (FII's), who seek highest expected returns on their investments, dump domestic financial assets to purchase foreign financial assets), which can result in a significant currency depreciation (i.e. significant depreciation of the domestic currency vis-à-vis foreign currencies).

Having given this example, let us return back to currency appreciation, as we need to mention something important:

When domestic interest rates rise, due to higher inflation and inflation expectations, domestic financial assets tend to become more attractive to foreign investors when compared to foreign financial assets (as a result of a rise in domestic interest rates relative to foreign interest rates). Consequently, demand for domestic currency in the foreign exchange market rises (because foreign investors need domestic currency to purchase domestic financial assets) and the country experiences a capital inflow (to purchase domestic financial assets), which leads to currency appreciation – **that tends to dampen export demand, as domestic goods become more expensive for foreign residents.**

Next, it's important to note that the first official estimate of growth of quarterly GDP for a given quarter, for example the latest quarter, is usually released in the following month in many countries. Though this estimate does provide us with a valuable insight into the current macroeconomic performance or the state of an economy and where it might be heading in the coming quarters, yet it's advisable not to always put undue weight on the same and one must also interpret it with care. This is because the first official estimate of growth of quarterly GDP for a given quarter, for example the latest quarter, is usually subject to one or two subsequent revisions in the following months in most economies and if these revisions are large enough or substantial (which they sometimes can be, particularly in those economies where official data is not very reliable or of high quality) then it can sometimes significantly change one's outlook on the economy. This in turn would possibly require a reassessment of previous business/commercial/financial/strategic and investment related decisions taken soon after the release of the first official estimate of growth of quarterly GDP for a given quarter.

If official estimates of growth of quarterly GDP are often subject to large or substantial revisions in any economy, it leads to another major problem; policy makers find it hard or more challenging to assess the macroeconomic performance or state of the economy and the likely direction of the economy in the coming quarters. This makes the task of policy formulation and macroeconomic management particularly difficult for policy makers.

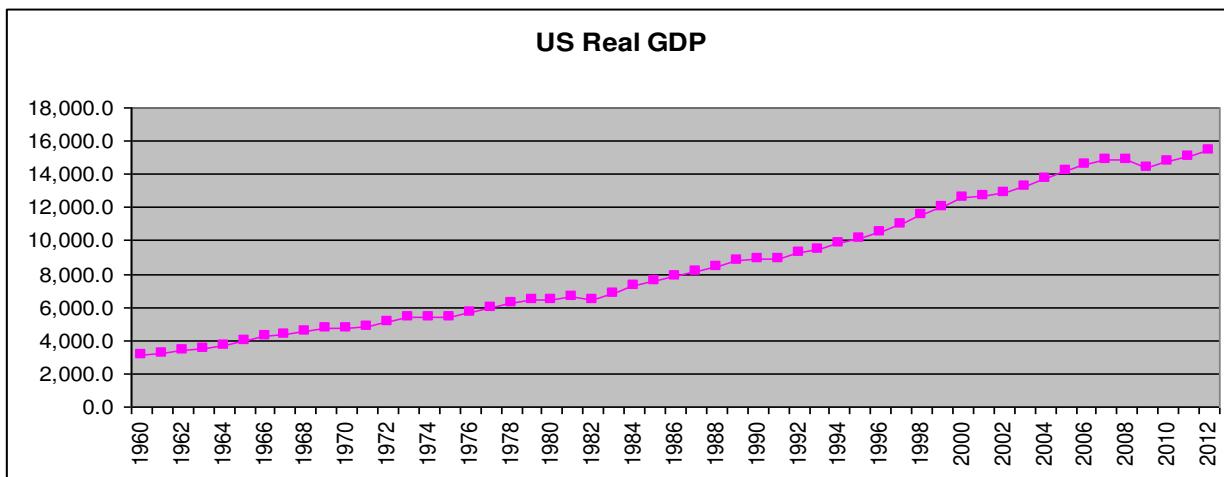
What we have just stated is to emphasize that the quality of GDP data and other official statistics that are released in any country must be high and reliable.

If such data is often subject to large or substantial revisions in any country, then it's possible that the quality and reliability of official statistics leaves much to be desired and hence one must exercise tremendous caution when attempting to interpret the first official estimate of growth of quarterly GDP for any given quarter.

Note: Different economies have different names for the first official estimate of GDP and its subsequent revisions (for example, preliminary estimate, advance estimate, revised estimate etc.). Do find out the terms for these estimates in your economy or any other economy that you wish to monitor or are interested in.

Having stated the above, given below is an example of the GDP of a country (US economy).

Graph: US GDP (i.e. US real GDP) - 1960-2012 (in billions of chained 2009 US\$)



Source: US Bureau of Economic Analysis

Given above is a graphic representation (**refer to the wavy pink line above**) of time series data (1960-2012) on the US real GDP. This graph shows that in the long run aggregate output (Y) i.e. real GDP of the US economy has been increasing or trending upwards, reflecting an overall trend of economic expansion over time (i.e. in the long run). **However, note that the long run trend of US real GDP does not follow a straight line, as is evident from the graph.** This is because though the trend of US aggregate output (Y) is rising upwards, which indicates economic expansion over time, the US economy has faced alternating periods of economic expansions and contractions in economic activity in the short run (i.e. the US economy has faced cyclical fluctuations in economic activity in the short run - which are known as '**Business Cycles**') due to which **economic growth has not followed (and doesn't follow) a smooth and steady path over decades.**

A similar pattern of macroeconomic behavior is exhibited by other countries across the globe who have witnessed an overall trend of economic expansion over time (i.e. in the long run). In the short run, they too, like the US economy, have faced cyclical fluctuations in economic activity (where there are alternating periods of economic expansions and contractions in economic activity) and due to such fluctuations economic growth in these countries too has not followed a smooth and steady path over decades (and consequently the long run trend of real GDP of these economies though trending upwards, does not follow a straight line).

It might be pertinent to mention here that the focus of this course is on the short run (rather than on the long run) where macroeconomic analysis focuses on business cycles, and macroeconomic policies (monetary and fiscal policies) that attempt to smoothen short run fluctuations in economic activity and achieve high, yet sustainable growth of GDP (along with price stability) in an economy.

Long run macroeconomic analysis on the other hand focuses on economic growth (i.e. sustained upward trend in an economy's aggregate output (GDP) over many decades) and policies relating to capital accumulation, labor supply, technological growth, savings rate, growth of population, labor productivity etc. that enhance economic growth in the long run (and also lead to higher living standards) in an economy. **It might be pertinent to mention here that traditionally macroeconomics is divided into the 'short run' and the 'long run.'**

Having stated the above, let us now turn to the definition of GDP and varied aspects of this barometer of the state of an economy.

A.1 GDP: Definition and Three Sides of GDP

Definition: GDP measures the market value of all final goods and services produced in a country or an economy in a given period of time (usually a quarter or a year) i.e. GDP is an aggregate measure of economic activity in an economy. As stated before, when we refer to GDP in this module and course we mean real GDP (which is measured in **constant prices** or prices during a reference or base year) i.e. **GDP adjusted for inflation**.

The purpose behind computation of **real GDP** is to isolate changes in output from changes in the price level, so that we know how much or how rapidly an economy has been growing as a result of an increase in the volume of output only – **which is what really matters**. So the growth rate of real GDP reveals changes in total output after adjusting for inflation.

On the other hand, **nominal GDP**, which is measured in current market prices, is not adjusted for inflation or price rises (i.e. it does not isolate changes in output from changes in the price level), so GDP will tend to appear higher than it actually is if we use this measure of GDP (i.e. nominal GDP).

Estimation of GDP

Having stated the definition of GDP, it's important to know that GDP is estimated in three ways or has three sides - GDP (Expenditure), GDP (Income) and GDP (Output) - which should ideally sum up to the same amount (where expenditure=income=output sides), but in practice or reality they don't due to various reasons and the difference is a statistical discrepancy.

It might be noted at the outset that the focus of this course is on GDP - Expenditure side. Therefore, we have explained the same in a fairly elaborate manner below, when compared to GDP – Income and GDP – Output sides **which we have mentioned only very briefly.**

1. GDP -Expenditure side

GDP -Expenditure side measures total final expenditure (i.e. the total of consumer spending (C), private investment (I), government expenditure (G) and net exports (X-M) i.e. exports (X) – imports (M)) incurred on the total or aggregate output (Y) produced in an economy during a given period of time (usually a quarter or a year) and **represents the aggregate demand side of the economy – where aggregate demand is equal to the sum of C, I, G and (X-M).**

(Note: C, I, G and (X-M) are the four components of aggregate demand).

GDP – Expenditure side can be written in the form of an equation:

$$Y = C + I + G + (X - M)$$

Constituents of GDP - Expenditure side (i.e. components of aggregate demand)

GDP - Expenditure side represents the aggregate demand side of the economy and the four components of aggregate demand are:

Consumer Spending (C) essentially means household consumption spending on durable and non-durable goods and services. It's typically or usually the dominant or largest component of aggregate demand and has a substantial effect on aggregate output of an economy. For example, consumer spending accounts for approximately 70% and 60% of aggregate demand or expenditure on aggregate output (Y) in the US and UK respectively.

An important point worth mentioning here is that trends in consumer spending in the US have important implications for global economic growth. This is because the US economy is a very large importer of goods from other countries and if there is a sharp slowdown in consumer spending in the US, it has a substantial downside effect on demand for goods produced by other economies (i.e. demand for their exports), which in turn adversely affects overall economic activity, growth and the labour market in these economies.

Private Investment (I) refers to gross private domestic investment and includes business fixed investment, residential investment and inventory investment by firms. Private investment adds not only to aggregate demand but also to the productive capacity of an economy. Though the share of private investment (I) in aggregate demand or expenditure is typically or usually much smaller than consumer spending in most economies, however, it is the most volatile and unstable component of aggregate demand in the short run and varies considerably over the business cycle. Further, private investment (I) tends to be more volatile than the GDP over the business cycle. Moreover, private investment (I) tends to grow more rapidly than GDP during economic expansions and fall by more than GDP during economic downturns.

Government Expenditure (G) includes government final consumption expenditures plus government investment expenditure (i.e. gross capital formation expenditure by the government) and is another major component of aggregate demand.

Examples of government final consumption expenditures are expenditure on services such as defense, law and order, education, public health etc. wages and salaries of government employees and purchases of goods and services, in order to provide services to the people. Such spending affects the economy right away.

Examples of government investment expenditures are construction of new roads, bridges, airports and other forms of infrastructure spending. Such spending promotes future growth.

If an economy needs a short run demand stimulus, in order to kick start economic recovery or boost growth, then the government can either enhance its final consumption expenditures or investment expenditures or even use a combination of these two types of expenditures.

Net Exports (X-M) is simply the value of exports (X) of goods and services minus the value of imports (M) of goods and services (**Note:** Net exports is also known as 'Trade Balance'). Exports(X) arise when residents of other countries (i.e. foreign residents) spend on the output of the domestic economy. Such spending adds to the demand for domestically produced output. At the same time, domestic residents spend on the output of other countries, which is termed as imports. Such spending by domestic residents on imports has to be subtracted from exports to arrive at the figure for net exports (X-M).

If net exports are continually negative for a long number of years it usually reflects a high level of imports and that the country is not exporting enough to pay for its imports, which can have serious repercussions for domestic macroeconomic stability and inflation and exchange rate stability.

A point worth mentioning is that in the case of imports, domestic spending is incurred on foreign output, rather than domestic output. This goes to reduce domestic expenditure on output produced within the borders of the country and has downside implications for domestic output, income and employment growth.

Having briefly mentioned about the four components of aggregate demand (i.e. the four constituents of the Expenditure side of GDP), **it's important to note** that while an increase in aggregate demand generally leads to more output and employment in an economy, however, if aggregate demand rises too fast relative to the aggregate supply or the productive capacity of an economy, the result will be sharply rising or accelerating inflation, rather than an increase in aggregate output (and employment). Therefore, policy makers desire that growth in aggregate demand should be high, yet sustainable. To fully grasp the concepts of aggregate demand and aggregate supply, please refer to **module 4 - 'Aggregate Demand and Aggregate Supply.'**

Having stated the above, provided below is a hypothetical example of the break up of GDP - Expenditure side of an economy for a particular quarter (for example, the fourth quarter of 2013) in billions of US\$.

Fourth Quarter 2013	Billions of US\$ (Level Value)	Share of GDP (%)
GDP	10,000	100
C	6,500	65
I	1,700	17
G	1,500	15
(X-M)	300	3

From this table you can gather that consumer spending (C), private investment (I), government expenditure (G) and net exports (X-M) accounted for 65%, 17%, 15% and 3% of GDP respectively in the fourth quarter of 2013 in a particular economy. We have provided you with this example just to enhance your understanding of the four constituents of GDP - Expenditure side (i.e. the four components of aggregate demand).

An important point worth noting here is that net exports (X-M) can either be positive or negative. When exports exceed imports, net exports are positive and when exports are lower than imports, net exports are negative. An increase in a country's exports increases aggregate or total final expenditure on domestically produced output. **On the other hand**, when domestic residents import goods from other countries, rather than purchasing the same from domestic suppliers, they are spending money or incurring expenditure on foreign output rather than domestic output, which reduces the aggregate or total final expenditure on domestically produced output.

2. GDP - Income side

GDP - Income side measures the sum of total factor incomes (wages, salaries, interest rent, profits etc.) earned by individuals and corporations in the production of total or aggregate output in an economy during a given period of time (usually a quarter or a year). These incomes are returns to labor and the capital employed for production of output in an economy.

A very important point to note with reference to the share of factor incomes among labor and capital is that, on the average, typically about two thirds of such incomes (gross) go to labor and the rest to capital. Since a very large percentage (%) of factor incomes usually go to labor, the state of the labor market has important implications for the pace of growth of an economy.

GDP - Income side is used to calculate the per capita income of a country.

3. GDP - Output side

GDP - Output side measures the total or aggregate output produced by each sector (i.e. broadly categorized into agriculture (and allied activities), industry and services sectors) of an economy during a given period of time (usually a quarter or a year).

It might be noted that GDP - Output side represents the aggregate supply side of the economy and informs us about the relative size or importance of each sector in terms of their share (%) in the domestically produced output.

Having stated the three different ways in which GDP of a country is estimated, it's important to note that GDP - Expenditure side is usually the preferred or 'headline' macroeconomic indicator to assess the state of the economy in most economies. However, in some economies official data on GDP - Expenditure side is unreliable and consequently GDP - Output side is the **preferred or 'headline' macroeconomic indicator to assess the state of the economy**.

Essentially, policy makers and analysts in most economies focus on GDP growth (%) – Expenditure side (along with growth (%)) in each of its constituents – consumer spending, private investment, government expenditure and net exports) to gauge the state of the economy.

However, in some economies, where official data on GDP - Expenditure side is unreliable, the focus is on GDP growth (%) - Output side (along with growth (%)) in each sector **i.e. sectoral contribution of each sector** - broadly categorized into agriculture (and allied activities), industry and services sectors) to gauge the state of the economy.

Having stated the above, as already mentioned before, the focus of this course is on GDP - Expenditure side. This is because macroeconomic policy focuses predominantly on the Expenditure side of GDP (i.e. aggregate demand side of the economy) in the short run.

In other words, macroeconomic policy focuses predominantly on management of aggregate demand in the short run for sound macroeconomic management. Consequently, it is the aggregate demand side of the economy that is of importance in the short run, rather than the aggregate supply side of the economy. This is because it takes time (over the long run) to enhance the productive (i.e. aggregate supply) capacity of an economy

Having stated the above, it might be noted that macroeconomics for the short run (and related analysis) focuses on business cycles (i.e. short run fluctuations in economic activity in an economy - **which are primarily or usually due to fluctuations in aggregate demand** rather than aggregate supply), and macroeconomic stabilization policies (monetary and fiscal policies) that are used for short run aggregate demand management - in order to smoothen short run fluctuations in economic activity and achieve high, yet sustainable growth of GDP (along with price stability) in an economy.

It might be noted that macroeconomics for the short run focuses on the aggregate demand side of the economy, while macroeconomics for the long run focuses on the aggregate supply side of the economy.

Having stated the above, let us now turn to important points (listed on pages 12-13) with reference to GDP which are worth keeping in mind.

A.2 Important points with reference to GDP – worth keeping in mind

- $C + I + G + (X - M)$ represents aggregate or total expenditure on domestically produced output i.e. aggregate demand for domestically produced output. **Having stated this**, an important point worth mentioning is that domestic households, firms and the government (i.e. domestic residents) do not spend only on domestically produced output, but also spend on output produced in other countries (i.e. imports (M)). Therefore, M is subtracted from the equation $Y = C + I + G + (X - M)$. Further, X (exports) is added to this equation, as foreign residents also spend on domestically produced output – **adding to the demand for or expenditure on domestically produced output**.
- Only final goods, not intermediate goods (i.e. goods used in the production of final goods), are included in the computation of GDP of a country.
- Only goods produced and services offered during a given or specific time period (typically a quarter or a year) are included in the computation of GDP for that particular period.
- Transfer incomes such as unemployment benefits, pensions, etc. are not included in the computations of GDP as they represent monetary transfers to individuals with no corresponding receipt of goods or services. Moreover, income from capital gains and loans taken for consumption purposes are not included in the computation of GDP.
- When countries are structurally different, for example, US and China, and one wishes to compare their overall macroeconomic performance, then the appropriate measure for such comparison is the growth rate of their respective GDP's.
- It must be noted that the output of goods and services produced only by the factors of production located within an economy (irrespective of the nationality of the labour employed in the production process and the organization) will be included in the GDP of that economy. For example, if Japanese companies produce cars in the US or a foreign worker is employed in the US and is producing output there, then such output will be included in the US GDP as production is taking place within the boundaries of the US economy.
- How powerful is the impact of the global economic environment on the rate of growth of GDP of an economy and fluctuations or volatility in the same depends on the degree of 'openness' of that economy and its integration with the global economy.
- The trend of rapidly accelerating economic integration and interdependence between countries, due to marked increase in cross-border trade, investments and capital flows (i.e. more 'openness'), is making economies more vulnerable to external shocks and to increases and decreases in spending or demand levels in other countries, which in turn is leading to greater fluctuations and volatility in their respective GDP's in the short run. Consequently, monitoring the economic performance of major economies (such as the US, Eurozone, China, Japan, Germany and UK) has become an imperative (as these economies drive the world economy) and also monitoring the economic performance of a country's trading partners is of paramount import or significance.
- **Financial globalization is exacerbating or increasing fluctuations or volatility in the rate of growth of GDP of many economies across the globe.**

- Impact of changes in the GDP of an economy on its stock market and the bond market can be significant.
- The nominal GDP can be a misleading indicator of the state of an economy or its macroeconomic performance, as unlike real GDP, it does not account for inflation. When inflation is not accounted for in the GDP statistics, then GDP will appear higher than what it actually is – giving an erroneous or misleading picture about the state of an economy.
- The GDP of a country represents the value of all final output (of goods and services) produced in a country during a given or specific period of time (typically a quarter or a year). However, what is produced is not always sold. The part of output that is produced, yet not sold, is a part of inventory and is therefore classified as additions to inventory (**which is a part of private investment (I)**).

It might be noted that additions to inventory during a given or specified period of time are also counted as a part of GDP for that period. In other words, additions to inventory during any given or specific time period must be added to the actual output of goods and services sold to domestic residents and foreign residents to calculate or arrive at the GDP for that particular period.

In essence, both final output sold and not sold (= final output produced) are counted as part of GDP.

- There is a difference between GDP (gross domestic product) and gross national product (GNP). **GNP = GDP + Net Factor Income from Abroad** (i.e. factor income received from abroad – factor payments made abroad). Examples of factor incomes and payments are wages, salaries, rent, dividend, interest and profits.
- The three main sources of economic growth in a country over time (i.e. in the long run) are increases in labour supply and capital, rise in the productivity of these two factors of production (labour and capital) and technological advances.

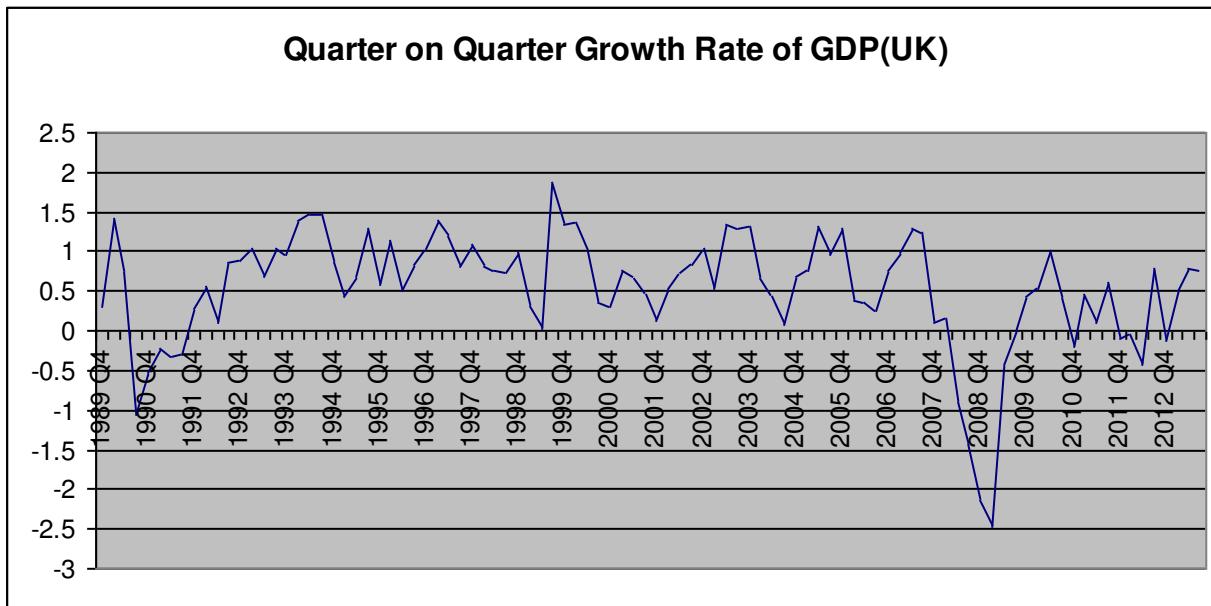
Having stated the above, let us now turn to a practical example of GDP growth (i.e. real GDP growth) of an economy.

A.3 Example of GDP growth (i.e. real GDP growth)

Provided below is an example of quarter-on-quarter growth rate (%) of GDP and year-on-year growth rate (%) of quarterly GDP along with formulas to compute these growth rates and certain important points with reference to these growth rates.

1. Quarter-on-quarter growth (%) of GDP

Provided below is a graph of quarter-on-quarter growth rate (%) of GDP (UK economy) for every quarter from 1989Q4 to 2013Q3 (**Note: Q refers to ‘Quarter’**)



Source: Office for National Statistics, UK

Computation of quarter-on-quarter growth rate (%) of GDP

Formula

$$\frac{(\text{GDP (2013 Quarter t)} - \text{GDP (2013 Quarter t-1)})}{\text{GDP (2013 Quarter t-1)}} \times 100$$

$$\frac{\text{GDP (2013 Quarter t-1)}}{\text{GDP (2013 3rd Quarter)}}$$

For example, if you want to compute quarter-on-quarter growth rate (%) of GDP of an economy for the 4th quarter of 2013, then the formula is:

$$\frac{(\text{GDP (2013 4th Quarter)} - \text{GDP (2013 3rd Quarter)})}{\text{GDP (2013 3rd Quarter)}} \times 100$$

$$\frac{\text{GDP (2013 3rd Quarter)}}{\text{GDP (2013 2nd Quarter)}}$$

Or

If you want to compute quarter-on-quarter growth rate (%) of GDP of an economy for the 3rd quarter of 2013, then the formula is:

$$\frac{(\text{GDP (2013 3rd Quarter)} - \text{GDP (2013 2nd Quarter)})}{\text{GDP (2013 2nd Quarter)}} \times 100$$

$$\frac{\text{GDP (2013 2nd Quarter)}}{\text{GDP (2013 1st Quarter)}}$$

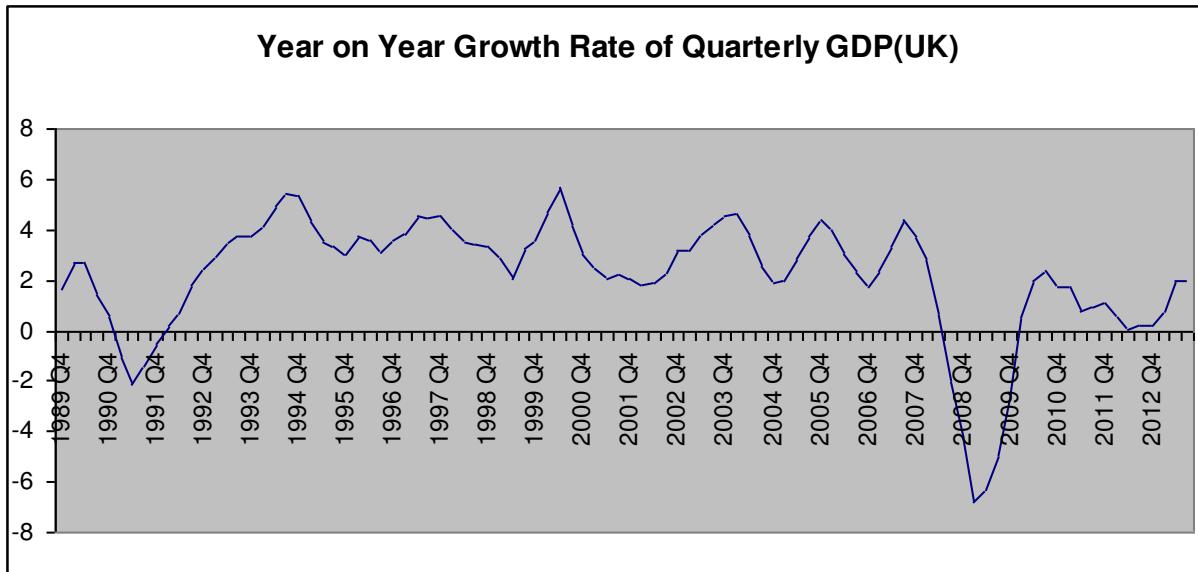
Similarly, we can obtain the quarter-on-quarter-growth rate (%) of GDP for any quarter or for as many quarters as we like. You can easily use the Excel spreadsheet to perform such computations.

Key points with reference to quarter-on-quarter growth rate (%) of GDP

- Quarter-on-quarter growth rates of GDP are crucial to track and monitor the quarterly changes or evolution of an economy and help to provide a snapshot or a summary view of the current and very recent macroeconomic performance of an economy i.e. quarter-on-quarter growth rates of GDP are very useful to monitor and track short term macroeconomic developments in an economy and its growth momentum.
- The main advantage of quarter-on-quarter growth rates of GDP is that they can be used for relatively quick or early detection or identification of turning points in economic activity (i.e. economic expansions and downturns) in an economy. In comparison, year-on-year growth rates of quarterly GDP are slower in the detection or identification of turning points in economic activity in an economy.
- For computation of quarter-on-quarter growth rates of GDP, the GDP data must be seasonally adjusted, in order to eliminate the effect of seasonality on such data. The presence of seasonal fluctuations in the GDP data can obscure the underlying trend in such time series data and consequently lead to erroneous conclusions about the current and very recent macroeconomic performance of an economy.
- Quarter-on-quarter growth rates of GDP can be quite or highly volatile from quarter to quarter. Therefore, robust growth of GDP in one quarter does not always imply that the economy will continue to grow rapidly in the subsequent quarter. It's very important to keep this in mind.
- The occurrence of irregular events in any given quarter or quarters, for example, wars, droughts, surge in oil prices, strikes, natural disasters, financial crisis etc. can cause a substantial plunge in output in an economy and result in quarter-on-quarter growth rates of GDP being highly variable, which in turn can obscure the underlying trend in such time series data. Therefore, when you analyze quarter-on-quarter growth rates of GDP for a given period (for example, for 3-4 quarters) or the quarter-on-quarter growth rate of GDP for the most recent quarter (i.e. the latest quarter for which official estimate of quarter-on-quarter growth rate of GDP is available) do **investigate** if there has been an occurrence of an irregular event or events in the same period (i.e. quarter or quarters) and how severely has it affected output.
- A major disadvantage of quarter-on-quarter growth rates of GDP is that they are subject to more frequent or larger revisions, when compared to year-on-year growth rates of quarterly GDP.

2. Year-on-year growth(%) of quarterly GDP

Provided below is a graph of year-on-year growth rate (%) of quarterly GDP (UK economy) for every quarter from 1989Q4 to 2013Q3 (**Note: Q refers to ‘Quarter’**)



Source: Office for National Statistics, UK

Computation of year-on-year growth rate (%) of quarterly GDP

Formula

$$\frac{(\text{GDP (2013 Quarter t)} - \text{GDP (2012 Quarter t)})}{\text{GDP (2012 Quarter t)}} \times 100$$

$$\frac{\text{GDP (2012 Quarter t)}}{\text{GDP (2012 Quarter t)}}$$

For example, if you want to compute year-on-year growth rate (%) of quarterly GDP of an economy for the 4th quarter of 2013, then the formula is:

$$\frac{(\text{GDP (2013 4th Quarter)} - \text{GDP (2012 4th Quarter)})}{\text{GDP (2012 4th Quarter)}} \times 100$$

$$\frac{\text{GDP (2012 4th Quarter)}}{\text{GDP (2012 4th Quarter)}}$$

Or

If you want to compute year-on-year growth rate (%) of quarterly GDP of an economy for the 3rd quarter of 2013, then the formula is:

$$\frac{(\text{GDP (2013 3rd Quarter)} - \text{GDP (2012 3rd Quarter)})}{\text{GDP (2012 3rd Quarter)}} \times 100$$

$$\frac{\text{GDP (2012 3rd Quarter)}}{\text{GDP (2012 3rd Quarter)}}$$

Similarly, we can obtain the year-on-year growth rate (%) of quarterly GDP for any quarter or for as many quarters as we like. You can easily use the Excel spreadsheet to perform such computations.

Key points with reference to year-on year growth rate (%) of quarterly GDP:

- Year-on-year growth rates of quarterly GDP for several quarters provides us with a more sound or reliable underlying picture of short run fluctuations in economic activity (known as 'Business Cycles') in an economy than quarter-on-quarter growth rates of GDP.
- If we wish to gauge the macroeconomic performance of an economy over the last four quarters (including the latest quarter for which official estimate of GDP has been released) i.e. how rapidly or slowly has the economy actually grown in the last four quarters, it's preferable to use year-on-year growth rates of quarterly GDP rather than quarter-on-quarter growth rates of GDP, as year-on-year growth rates of quarterly GDP are a more reliable or sound measure of the underlying pace of growth of an economy over a longer period.
- An important reason why economists and analysts prefer to rely on year-on-year growth rates of quarterly GDP over quarter-on-quarter growth rates of GDP is that the former are subject to smaller revisions than the latter.
- Year-on-year growth rates of quarterly GDP are more useful in detection of underlying trends in the pace of economic activity in an economy (as they display an underlying trend) than quarter-on-quarter growth rates of GDP. **In other words**, year-on-year growth rates of quarterly GDP give a better or a more sound picture of the underlying growth rate of an economy over a longer period than quarter-on-quarter growth rates of GDP.
- Generally, when an economy is on a steady growth path (rather than growth being highly volatile or subject to considerable volatility) focusing only on year-on-year growth rates of quarterly GDP would be adequate for most purposes. However, when growth in an economy is highly volatile or subject to considerably volatility in the short run, then one also needs to pay attention to quarter-on-quarter growth rates of GDP.
- Many countries have adopted year-on-year growth of quarterly GDP as the primary measure of economic activity.
- Year-on-year growth rates of quarterly GDP are also sensitive to occurrence of irregular events. **For example**, if there was an occurrence of an irregular event that caused a substantial plunge in output in a particular quarter this year, then the corresponding quarter of the next year (assuming that there is no occurrence of any irregular event) could show an exceptionally strong year-on-year growth in quarterly GDP – **which can be very misleading**.
- Analysis of year-on-year growth rates of quarterly GDP of the previous 3 to 5 years is more than adequate (for most situations) if one wants to obtain or gain a sound insight of the underlying short run macroeconomic trends in an economy and changes in the same.

A.4 GDP data – Important things to look for**1. GDP Expenditure side – Important things to look for**

Though GDP is measured in three different ways (as stated on page 7), in reality, when official data is reliable, the growth rate of GDP - Expenditure side (which represents the aggregate demand side of an economy) is usually the preferred or principal macroeconomic variable used to measure the macroeconomic performance of an economy.

Consequently, quarter-on-quarter change i.e. quarter-on-quarter growth rate (%) in its four components (i.e. consumer spending (C), private investment (I), government expenditure (G) and net exports (X-M) should be analyzed after official estimate of quarter-on-quarter growth rate (%) of GDP - Expenditure side for the latest quarter is released, in order to know which component (or components) is **currently** driving overall growth (i.e. growth in GDP - Expenditure side) or making a very strong contribution to it and which component (or components) is pulling down overall growth. **Such analysis is also very important**, as it is changes in aggregate demand that primarily determine changes or fluctuations in economic activity in an economy in the short run.

For such analysis, what one needs to do is to **compare** the overall quarter-on-quarter growth rate (%) of GDP - Expenditure side of an economy with the quarter-on-quarter growth rate (%) of each of its components (i.e. C, I, G, (X-M)) for the same period (as stated above). The component (or components) that registers a higher growth rate than the overall growth rate of GDP - Expenditure side is obviously making a very strong contribution to overall growth and driving it. While the component (or components) whose growth rate is less rapid or lower than the overall growth rate of GDP - Expenditure side is obviously pulling down overall growth.

For example, if, according to latest official data, the overall growth rate (quarter-on-quarter) of GDP - Expenditure side is 0.9% and growth rate of consumer spending (quarter-on-quarter) is 1.2%, then robust consumer spending is currently propelling or driving overall growth (i.e. making a very strong contribution to overall growth). **In other words**, since consumer spending is growing faster than GDP, overall growth is currently consumer driven. **On the other hand**, if the growth rate of private investment (quarter-on-quarter), for example, is only 0.6% (which is less than the overall growth rate (quarter-on-quarter) of GDP - Expenditure side), then weak growth in private investment is currently pulling down overall growth.

Similarly, you can compare the overall growth rate (quarter-on-quarter) of GDP - Expenditure side with the quarter-on-quarter growth rate of the other two components – **government expenditure and net exports** – to find out whether they are growing faster or slower than GDP and hence contributing strongly to overall growth or pulling it down.

Such analysis will enable you to determine whether current overall growth is being driven or pulled down by consumer spending, private investment, government expenditure or the external sector or some combination of these components of aggregate demand.

Having stated the above, let us now take four scenarios.

Scenario 1: Consumer Driven Growth

If upon such analysis we find that growth is being largely consumer driven (i.e. growth is consumer led), then one must find out if the productive capacity of the economy is keeping pace with the rapid growth in consumer spending.

If the productive capacity of the economy is not keeping pace with consumer spending, due to insufficient private investment, then firms will face increasing capacity constraints and supply bottlenecks, which can lead to higher inflation and inflation expectations (that invariably or ultimately results in lower overall growth) and more imports (to cater to robust consumer demand).

Higher imports in turn, unless counterbalanced by higher exports, will lead to lower **net exports**, which will have adverse implications for domestic economic activity, output and employment, and also put downward pressure on the domestic currency (i.e. possibly lead to currency depreciation) – **that can lead to higher domestic inflation (as imports will become more expensive for domestic residents, due to currency depreciation)**.

Another point worth mentioning is that if growth is largely consumer driven in an economy, consumer debt (i.e. household debt) can rise sharply and eventually to unsustainable levels and **make the economy more vulnerable to external shocks (such as a global financial crisis or an unexpected surge in international oil prices)**. Further, if external shocks were to hit an economy that has a high or unsustainable level of consumer debt, due to growth being largely consumer driven, then the economic downturn is likely to be more severe or protracted.

Scenario 2: Investment Driven Growth

If upon such analysis we find that growth is being largely driven by private investment, then this is usually desirable as private investment activity enhances the productive capacity of an economy (which increases the capacity of an economy to supply more output in the future) and also provides a boost to GDP growth in the short run. **However, there is a word of caution here.**

If, for example, a high level of private investment is taking place in an economy in the face of limited domestic consumption and sluggish export demand, then this could lead to problems of excess supply or supply glut, substantial idle or unutilized plant and machinery in various sectors of the economy, inefficient use of capital, unplanned increase in inventories, marked rise in corporate debt and reduction in corporate profitability – **which could endanger the financial stability of the country. Such an economy is in an urgent need of ‘rebalancing.’**

In other words, such an economy urgently needs a reorientation of growth away from being largely investment driven to being more domestic consumption and export driven (through various policy initiatives), **in order to witness or have more ‘balanced’ and sustainable overall growth.**

Scenario 3: Government Expenditure Driven Growth

If upon such analysis we find that growth is being largely driven by government expenditure, it is probably indicative of the fact that the government is actively trying to stimulate the economy, possibly due to insufficient consumer spending, weakness in private investment activity, sluggish export demand or because of a combination of these factors, or to stabilize it (i.e. the economy) in the short run.

The problem with government expenditure driven growth is that though it can give a much needed boost to a flagging economy in the short run - in the face of deficiency of domestic demand (i.e. consumer and private investment demand) and export demand - **yet such growth is not sustainable in the medium run or the long run**. This is because government expenditure driven growth usually leads to a higher fiscal/budget deficit and rising inflation and consequently results in higher domestic interest rates - **which tends to dampen private investment activity and consumer spending and ultimately leads to lower aggregate demand and output** (i.e. lower GDP growth).

Also, when a government borrows from the market, in order to finance an increase in government expenditure (to stimulate the economy or to stabilize it), it has to compete with firms for available loanable funds. Such competition for funds between the government and the firms can drive up the cost of borrowing for firms (as domestic interest rates are likely to go up), which in turn could significantly dampen or ‘crowd out’ private investment – ultimately leading to lower aggregate demand, output and employment.

Scenario 4: Export Driven Growth

If upon such analysis we find that growth is being largely export driven (which will be reflected in rising net exports), it is indicative of the fact that domestically produced goods are in high demand abroad. Consequently, if there is an economic boom in the economies of the trading partners of this (domestic) economy, then these boom conditions abroad will probably be transmitted home (i.e. to this economy) via increased demand for its output, which in turn is likely to lead to higher GDP growth, falling unemployment and rising incomes in this economy. **However, there is a word of caution here.**

An economy in which growth is largely export driven is substantially more exposed to the fluctuations in GDP of other economies and external shocks (such as a global financial crisis).

For example, if the economies of the trading partners of an economy (which is largely export driven) unexpectedly face recessionary conditions (due to any reason or reasons), or there is an external shock (such as a global or a regional financial crisis) that results in economic activity plummeting in the economies of the trading partners, then the recessionary conditions or economic downturn in these economies is likely to get transmitted to this economy (where growth is largely export driven) via a marked fall in demand for its output, which in turn is likely to lead to contracting economic activity, rising unemployment and falling incomes in this economy.

Having stated the above, let us now turn to the next point.

If you are interested in knowing which component (or components) of GDP - Expenditure side has **recently** (i.e. **in the past 4 quarters**, including the latest quarter for which official GDP data has been released) been driving overall growth in an economy and which component (or components) has been pulling it down, then it's preferable to use year-on-year growth rates of quarterly GDP - Expenditure side and compare it with year-on-year quarterly growth rates of each of its components (i.e. C, I, G, (X-M)) for all the 4 quarters.

The component (or components) that has **usually or on the average** been growing more rapidly than GDP - Expenditure side over the past 4 quarters has obviously been driving overall growth or making a strong contribution to it over this period. **On the other hand**, the component (or components) that has usually or on the average been growing more slowly than GDP - Expenditure side over the past 4 quarters has obviously been pulling down overall growth over this period.

Having stated the above, it might be pertinent to mention that when you perform the aforesaid types of analysis (either for the latest quarter or for the past 4 quarters – as stated above) do find out the percentage (%) share of each component in GDP - Expenditure side (i.e. share of each component as a percentage (%) of GDP - Expenditure side). **This is because of two reasons.**

First, for example, if private investment (I) and consumer spending account for around 50% and 20% respectively of GDP - Expenditure side in an economy (though typically it is the other way around) and both private investment and consumer spending register the same rate of growth (for example, 0.7%), then private investment will boost GDP more than consumer spending as it accounts for a much larger percentage (%) share (around 50%) of GDP - Expenditure side than consumer spending (around 20%).

Second, larger the percentage (%) share of any particular component in GDP - Expenditure side more pronounced or amplified will its effect (positive or negative) be on overall growth.

For example, if consumer spending accounts for around 70% of GDP - Expenditure side in an economy, then a collapse in consumer demand can plunge the economy into a recession or a protracted economic slowdown. Whereas, if net exports account for only 3% of GDP - Expenditure side in an economy, then a collapse in export demand (i.e. collapse in demand by foreign residents for domestically produced output) will dampen aggregate demand and economic activity in this economy, yet the downside effect on this economy is likely to be much less pronounced or severe when compared to a collapse in consumer demand, as the economy is not heavily dependent on export revenues and consequently the adverse impact of external shocks on its GDP growth is likely to be much less severe or pronounced.

Having stated the above, let us now turn to the next point.

If one is interested in gaining an insight into the demand structure of an economy and how it is changing over time, then it's advisable to take at least 10 years (and ideally 30 years) of annual (yearly) data on all the components of GDP - Expenditure side and obtain their percentage share (%) for each year.

Analyzing such data will reveal whether the demand structure of an economy is balanced or not and whether any gradual 'rebalancing' of the economy has been taking place (if the share of any component as a percentage (%) of GDP - Expenditure side is unduly high).

This kind of analysis will also reveal:

1. Importance of government expenditure in an economy.
2. 'Openness' of an economy to international trade.
3. Whether an economy has been investing enough or not over a decade (or more) to increase its productive capacity (which enhances supply of output in the future and leads to higher economic growth).
4. Whether an economy has been investing excessively (leading to a supply glut).
5. Whether there has been excessive consumer spending and insufficient investment spending (i.e. insufficient private investment) in an economy (which invariably leads to higher domestic inflation and interest rates).

Having stated the above, mentioned below are few important points with reference to GDP - Expenditure side, as they are important from the point of 'real world' macroeconomic analysis.

While GDP is usually the primary and the most comprehensive or broadest measure of macroeconomic performance of a country or the state of an economy, it's important to know that one should not only rely on the overall GDP figure to make an assessment of the state of an economy for any particular time period (say for a quarter or a year) and its short run economic outlook. This is because the overall GDP figure for any particular time period (say for a quarter or a year) can sometimes distort the underlying reality about the true state of an economy, as it includes investment in inventories (or what is commonly called **changes in business inventories**) by firms. **Read on and this point should become very clear to you.**

Total Final Sales

If you wish to obtain a '**true**' picture of the actual amount of domestically produced output that was sold to domestic and foreign residents in a particular time period (for example, in a quarter or a year) i.e. obtain a '**true**' picture of the underlying strength or weakness of domestic and foreign demand (i.e. total demand) for domestically produced output during a specific period of time, then one should subtract investment in inventories (or what is commonly called **changes in business inventories**) undertaken by firms (which is a part of private investment (I)) in that particular time period from the overall GDP figure for that particular time period – **to arrive at what is called or termed as 'Total Final Sales' (termed as Z here).**

Inclusion of investment in inventories i.e. **changes in business inventories** in the overall GDP figure distorts the true picture of the underlying strength or weakness of domestic and foreign demand for domestically produced output and consequently could result in an incorrect assessment of the state of an economy and its short run economic outlook.

'Total Final Sales' (termed as Z here) of domestically produced output can be calculated by using the following equation:

$$Z = C + I - \text{Inventory Investment (i.e. Changes in Business Inventories)} + G + (X - M) \quad (1)$$

(Basically this formula gives us 'Total Final Sales' i.e. GDP – changes in business inventories).

If you recollect, the formula for GDP - Expenditure side is:

$$Y = C + I + G + X - M$$

(Note: private investment includes investment in inventories i.e. **changes in business inventories**, which has been excluded in equation 1, to arrive at '**Total Final Sales'**)

Having stated the above, one should compare the year-on-year quarterly growth rate of total final sales with that of year-on-year growth rate of quarterly GDP for the **latest quarter for which official GDP data is available**. If total final sales are growing slower than GDP, it may be signaling an economic slowdown in the coming quarters due to slowing demand (domestic and foreign) for domestically produced output, which could result in an unintended rise or build-up of business inventories (i.e. goods unsold) and consequent cut back in production by firms.

On the other hand, if total final sales are growing faster than GDP, it may be signaling strong economic expansion in the coming quarters due to growing demand (domestic and foreign) for domestically produced output, which could result in an unexpected depletion in business inventories and an increase in production by firms to cater to increasing demand.

Next, one should also compare the year-on-year quarterly growth rate of total final sales with that of year-on-year growth rate of quarterly GDP for the previous 4 quarters (including the latest quarter for which official GDP data is available), in order to obtain a more accurate assessment of the **recent and current** underlying strength or weakness of total demand (domestic and foreign) for domestically produced output.

Such analysis, as stated above, should provide you with a more accurate assessment of the underlying reality about the true state of an economy.

Domestic Final Sales

If you are interested in gauging only the ‘true’ underlying strength or weakness of **domestic demand for output produced both domestically and in other countries** (i.e. demand for imports) in any particular time period (for example, in a quarter or a year) - as reflected by actual expenditure on output incurred (i.e. goods and services actually bought) by domestic residents in that particular time period regardless of whether the output was produced domestically or abroad – **then one should focus on ‘Domestic Final Sales’ (termed as L here), which can be calculated by using the following equation:**

$$L = C + I - \text{Inventory Investment (i.e. Changes in Business Inventories)} + G \quad (2)$$

Where L represents ‘Domestic Final Sales’ of output produced both domestically and abroad (i.e. output that is actually sold) to domestic residents in any particular time period (for example, in a quarter or a year). Note, investment in inventories i.e. changes in business inventories, and net exports (X-M) have been excluded from equation 2.

It might be noted that ‘**Domestic Final Sales**’ is an excellent measure of the underlying strength or weakness of actual domestic demand for both domestic and foreign output in any particular time period.

A strong year-on-year quarterly growth in domestic final sales usually implies robust domestic demand for both domestic and foreign output, while a weak year-on-year quarterly growth in the same implies weak domestic demand for both domestic and foreign output.

2. GDP Output Side – Important things to look for

In some economies, where official data on GDP - Expenditure side is unreliable, the focus is on GDP growth (%) - Output side.

This measure of GDP represents the aggregate supply side of an economy and informs us about the relative size or importance of each sector (broadly categorized into agriculture (and allied activities), industry and services sectors) in an economy in terms of its percentage (%) share in aggregate output (i.e. as a percentage (%)) of GDP - Output side) and how the percentage (%) share of each sector is changing over time.

If one is interested in knowing which sector (or sectors) of the economy is currently driving overall growth and which sector(or sectors) is pulling it down, then compare the overall quarter-on-quarter growth rate (%) of GDP - Output side with quarter-on-quarter growth rate (%) of each of the sectors (broadly categorized into agriculture (and allied activities), industry and services sectors) after official quarter-on-quarter growth rate (%) of GDP - Output side for the latest quarter is released.

The sector (or sectors) that registers a higher growth rate (%) than the growth rate (%) of GDP - Output side is obviously making a very strong contribution to overall growth and driving it. While the sector (or sectors) whose growth rate is less rapid or lower than the growth rate of GDP - Output side is obviously pulling down overall growth.

For example, if, according to latest official data, growth rate (%) of GDP (quarter-on-quarter) - Output side is 0.8% and the services sector growth (quarter-on-quarter) is 1.2%, then the services sector is currently propelling or driving overall growth (i.e. making a very strong contribution to overall growth).

On the other hand, if the agriculture sector or the industrial sector or both grow less rapidly (quarter-on-quarter) than the growth rate (%) of GDP (quarter-on-quarter) - Output side, then either of them or both are **currently** pulling down overall growth.

Next, if you are interested in knowing which sector (or sectors) of the economy has **recently** (i.e. in the past 4 quarters, including the latest quarter for which official GDP data has been released) been driving overall growth and which sector (or sectors) has been pulling it down, then it's preferable to use year-on-year growth rates of quarterly GDP - Output side and compare it with year-on-year quarterly growth rates of each of the sectors for all the 4 quarters.

The sector (or sectors) that has **usually or on the average** been growing more rapidly than GDP - Output side over the past 4 quarters has obviously been driving overall growth or making a very strong contribution to it over this period. **On the other hand**, the sector (sectors) that has **usually or on the average** been growing more slowly than GDP - Output side over the past 4 quarters has obviously been pulling down overall growth over this period.

Having stated the above, it might be pertinent to mention that when you perform the aforesaid types of analysis (either for the latest quarter or for the past 4 quarters – as stated above) do find out which is the most important sector of the economy (in terms of its share as a percentage (%) of GDP - Output side). This is because if two sectors register the same rate of growth, the sector that has a much higher share in aggregate output (i.e. higher share as a percentage (%) of GDP - Output side) will boost GDP more as it accounts for a much larger share of economic activity in the economy.

For example, if the share of the services sector (i.e. as a percentage (%) of GDP - Output side) is 75% or more in an economy (which is the case in some developed economies) and the share of the industrial sector or the agriculture sector is only 10-12% in that economy, then a 1% growth in the services sector will boost GDP more than a 1% growth in the industrial sector or the agriculture sector.

Next, one should be aware of the sectoral composition of aggregate output in an economy i.e. the relative size or importance of each sector (broadly categorized as agriculture (and allied activities), industry and services sectors) in an economy in terms of its percentage (%) share in GDP - Output side. **This is due to two reasons.**

First, because the sectoral composition of aggregate output is used to assess the level of development of an economy. Greater the share of the services sector (as a percentage (%)) of GDP - Output side) in an economy, higher is the level of development of that economy.

It might be noted that the share of services sector (as a percentage (%)) of GDP - Output side) is more than 70% in many developed economies (and in some developed economies the share of the services sector is above 75% - as stated before). Emerging/developing economies (such as China, India, South Africa, Brazil etc.) too are trying to increase the share of the services sector in their respective economies - **through various economic reforms.**

Second, the sectoral composition of aggregate output influences the demand structure of an economy.

For example, in an economy where the percentage (%) share of the services sector in GDP - Output side is large or dominant or is increasing rapidly, the demand for consumer durables, luxury goods etc. will be considerably higher or expanding more rapidly (due to higher or increasing incomes) than in an economy where the share of the agriculture sector or the industrial sector is large or dominant, or where the share of the services sector is stagnant or growing very slowly.

Having stated the above and before moving on to the next section i.e. section A.5 (next page), we would like to suggest something important; it's advisable to analyze both GDP growth (%) – Expenditure side (along with growth in each of its components) and GDP growth (%) - Output side (along with growth in each sector), as the former represents the aggregate demand side of the economy and the latter represents the aggregate supply side of the economy.

To understand how an economy really functions and how aggregate output (i.e. GDP) and the general price level (P) are determined in an economy it's important to understand both sides (aggregate demand and aggregate supply) of an economy, **even if GDP - Expenditure side is the preferred or 'headline' macroeconomic indicator to assess the state of the economy in most economies.**

Finally, let us now move on to the next section (A.5) where we have briefly mentioned three alternative indicators that can be used to assess the state of an economy reasonably well.

A.5 Alternative Indicators to Assess the State of an Economy – Very Important

Quarterly GDP data is usually released after a lag (i.e. usually released within 2 weeks to 3 months after the end of each quarter) in most countries. Further, such data is subject to frequent revisions (which can sometimes be significant).

Due to quarterly GDP data being usually released after a lag and subject to frequent revisions, policy makers, firms and participants in the financial markets often find it difficult to accurately assess the current state of an economy i.e. its current macroeconomic performance. To counter the aforesaid problem, one can consider looking at the monthly data on industrial production (i.e. monthly industrial production index) of an economy, which is usually available in a more timely manner.

Since industrial production demonstrates strong positive correlation with GDP (as manufacturing activity tends to closely parallel shifts in the overall economy), therefore, a pickup in its (industrial production) growth signals an expanding or growing economy and a deceleration or contraction in its (industrial production) growth signals a slowing or a contracting economy.

In other words, there is a close relationship between changes in industrial production and GDP growth, with the percentage (%) change in industrial production index indicating where the economy as a whole is going. **In essence**, industrial production can also be a valuable alternative indicator of short run changes in economic activity in an economy and is usually a more timely indicator of the state of an economy than GDP. It might be noted that **industrial production is a sound coincident indicator of overall economic activity in an economy**.

It might be pertinent to mention here that in order to gain an insight into the underlying growth rate of industrial production in an economy, it's advisable to look at a **three month moving average** of the percentage (%) change in the industrial production index.

Next, for those who are interested in technicalities, the usual close relationship (i.e. positive relationship) between GDP and industrial production in an economy can be demonstrated by taking year-on-year growth (or percentage (%) change) in quarterly GDP and quarterly industrial production index (by transforming monthly industrial production index series into quarterly industrial production series i.e. aggregating the monthly industrial production index series to a quarterly frequency) and plotting it. Such a plot is likely to show that when industrial growth increases, GDP growth also tends to rise and when industrial growth decelerates, GDP growth also tends to decelerate. **In essence**, fluctuations in GDP tend to be strongly positively correlated with fluctuations in industrial production.

Having stated the above, it might be interesting to note that, in addition to industrial production, there are usually two other excellent indicators - **monthly Purchasing Managers Index (PMI) for the manufacturing sector (derived from monthly survey of private sector firms) and car sales (monthly data) in an economy** – that are also released in a timely manner and provide very valuable signals of whether an economy is likely to expand or decelerate in the current quarter (for which the official GDP data is yet to be released), **as these two indicators tend to have a close relationship with the overall economy**.

For example, if in the current quarter, year-on-year growth in monthly industrial production and car sales in an economy demonstrate a pick up or robust growth and the monthly manufacturing PMI hovers above 50 in consecutive months of the current quarter, then this is indicative of an economy that is on an expansion path – **which will be reflected in rising GDP growth (when official estimate of the same is released with a lag after the end of the current quarter)**.

On the other hand, if in the current quarter, year-on-year growth in monthly industrial production and car sales in an economy demonstrate a fall or decline and the monthly manufacturing PMI hovers below 50 in consecutive months of the current quarter, then this is indicative of a weakening or a contracting economy – **which will be reflected in decelerating or negative GDP growth (when official estimate of the same is released with a lag after the end of the current quarter)**.

Essentially, these three indicators together should usually give us a sound indication of whether overall economic activity in an economy is likely to be sluggish/weak (or contracting), gain momentum and recover, or expand rapidly in the current quarter – **before official estimate of GDP growth for the current quarter is released**.

End of this module

