Chapter 37: Measuring economic activity – GDP and GNP (2.1)

Key concepts
- Measuring economic activity – GDP and GNP/GNI
- Output, income and expenditure methods of GDP accounting
- From GDP to GNP
- Nominal and real GDP
- Nominal and real GNP/GNI
- Per capita income
- Use of national income figures
- Green GDP (what the hell...)

Measures of economic activity (Gross Domestic Product, Gross National Product / Gross National Income)
- Distinguish between GDP and GNP/GNI as measures of economic activity
- Distinguish between the nominal value of GDP and GNP/GNI and the real value of GDP and GNP/GNI
- Distinguish between total GDP and GNP/GNI and per capita GDP and GNP/GNI
- Examine the output approach, the income approach and the expenditure approach when measuring national income
- Evaluate the use of national income statistics including their use for making comparisons over time, their use for making comparison between countries and their use for making conclusions about standards of living
- Explain the meaning and significance of “green GDP”, a measure of GDP which accounts for environmental destruction

• for figures on US CIGXM, see 
• and here in orig;
  http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=5&FirstYear=2009&LastYear=2010&Freq=Qtr

• Measuring economic activity – GDP and GNP
An electrician once took upon himself to explain to me – in between his bouts of drinking my beer and coffee while pretending to install a washing machine – how the flow of electricity through the wires resulted in different measurements such as ‘ohms’, ‘watts’ and ‘amperes’. I never understood it, but it seemed clear enough that final output of electricity could be calculated by using a number of different parameters – all of which had very specific meaning. Calculating output/income/expenditure is much the same since each different method results in identical values. The rest of the chapter will show different ways of calculating GDP and subsequent adjustments to this base figure. The plan of attack here is in three steps:

Compute the money value of aggregate output during a year, i.e. gross domestic product; GDP

Adjust for the use of foreign factors of production to arrive at gross national product/income; GNP/GNI

Take into consideration changes in the price level to show real output, real national income; GDP_{real} and GNP_{real}

- **Output, income and expenditure methods of GDP accounting**
  
  *Type 4 Medium heading* 1. Factor income method of accounting
  
  Adding up total payments for use of factors of production paid to households is commonly divided into four flows of payments; income from employment (wages) and income from self-employment (wages and profits); income to firms (profits); rents; and interest. These four correspond to the four factors of production: labour, entrepreneurs, land and capital.

  The easiest way to exemplify income accounting is to use some actual figures. The 2001 national income accounts for Ireland will be used for all three methods, starting off with the figures for factor incomes below, *figure 3.1.3*. In all three accounting methods I shall comment briefly on the posts and figures compiled in the accounts.¹

  **Figure: 3.1.3 Gross domestic product in Ireland 2001 – (factor) income method of accounting**

<table>
<thead>
<tr>
<th>Factor income</th>
<th>Amount (millions of €)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment income (wages)</td>
<td>47,090</td>
</tr>
<tr>
<td>Self-employment income (wages + profit)</td>
<td>10,903</td>
</tr>
<tr>
<td>Rental income</td>
<td>6,181</td>
</tr>
<tr>
<td>Private/public gross profits (profit)</td>
<td>26,290</td>
</tr>
<tr>
<td>Interest</td>
<td>11,619</td>
</tr>
<tr>
<td><strong>Total domestic income</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>less stock appreciation</td>
<td>218</td>
</tr>
</tbody>
</table>

¹The official figures for national income vary enormously in Official Accounts from country to country and can be immensely difficult to plough through. I owe a large debt of gratitude to Margaret Power at the Central Statistics Office of Ireland (*An Phríomh-Oifig Staidrimh* in Irish) for assistance in putting the following figures together for me.
• **Employment income** is readily understandable; it is the flow of payments to providers of labour for their services, called either wages or salaries.

• **Self-employment income** is the income generated by own businesses. It is accounted for and contains a profit element since an owner-operated business will generate a value-added element which goes to paying the owner’s wages.

• **Rental income** is generated when owners of land, housing and property receive payments for other economic agents’ use.

• Private and public **profits** are commonly separated in the accounts, but I have lumped them together here since the concept is the same; surpluses created by firms which are then paid back to the owners. This can be done directly (in small companies) or indirectly via dividends (= payouts) to shareholders.

• **Interest** in national income accounts is the bank interest earned by households. Households’ deposits are used by firms and the *payment* for the loans is the interest paid to households. (It is in fact *net* interest since households’ interest payments are deducted.)

• In assembling all the millions of figures comprising the national accounts, one tries to be as true to real output as possible. This can be tricky when dealing with the money values of goods since – as we shall see – price increases will distort (inflate) real output figures. We deduct **stock appreciation** in order to use a truer value since unsold goods and half-finished products lying in warehouses for lengthy periods would be given a higher value when added to the GDP figures than when originally produced. For example, a firm produces 100 Widgets in June and stocks them at a list price of AUD5 each, at a total value of AUD500. During the time these goods sit on the firm’s shelf waiting to be sold, the price level increases by 5% and when the firm’s annual report is filed the firm can list the unsold stock as an asset worth AUD 525 since inflation has added an additional AUD 25. However, the real contribution is only the original AUD 500 and the stock appreciation must be deducted.

• The final figure is then adjusted for a **statistical discrepancy**, which is basically assessed by comparing the values in all three methods and adding/subtracting an error component arrived at by comparing to an average based on all three accounting methods.

The compiled figures give us **GDP at factor cost**, which means that the final figure is to the furthest possible extent based on real use of factors of production which will compute with real expenditure figures in the next method of GDP accounting.

**2. Expenditure method of accounting**

The basic accounting premise here is that all expenditure flows from economic agents (households, firms, government, and foreigners) constitute total expenditure and thus income. Basically, this method of accounting looks at total spending during a period of time and divides the spenders up into groups in order to follow the flows and see who is spending on what. Total expenditure in an economy becomes the sum of consumption expenditure (C), investment expenditure (I), government expenditure (G), export expenditure (X) minus the import expenditure (-M). While you skim through Irish expenditure in *Figure 3.1.4*, try to figure out why we subtract imports from GDP.

**Figure: 3.1.4**
### Expenditure Method of Accounting

<table>
<thead>
<tr>
<th>Expenditure type</th>
<th>Amount (millions of €)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household consumption (C)</td>
<td>55,202</td>
</tr>
<tr>
<td>Total private expenditure on capital (plus physical change in stocks) (I)</td>
<td>27,461</td>
</tr>
<tr>
<td>Government expenditure (G)</td>
<td>15,413</td>
</tr>
<tr>
<td>Exports (X)</td>
<td>112,938</td>
</tr>
<tr>
<td>Imports (-M)</td>
<td>-95,702</td>
</tr>
<tr>
<td>less taxes on expenditure</td>
<td>-14,572</td>
</tr>
<tr>
<td>plus subsidies</td>
<td>2,697</td>
</tr>
<tr>
<td>statistical discrepancy</td>
<td>-569</td>
</tr>
<tr>
<td>GDP at factor cost</td>
<td>102,869</td>
</tr>
</tbody>
</table>

*less taxes on expenditure*  
*plus subsidies*

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- **Consumption** measures the amount of personal money spent on goods and services during the year. Consumption is often divided into **durables** (cars, refrigerators etc.), **non-durables** (beer and Donegal tweed) and **services** (such as car repairs, hotel stays and banking).

- **Investment** is firms’ expenditure on capital goods such as machines, equipment and factories, often referred to as **fixed capital formation**.

- Governments build roads, hire more teachers and buy fighter aircraft from domestic firms – this is simply your tax money buying goods and services; **government spending**. Since it is far easier to account for the market price of a jet fighter than 100,000 school hours, many services are estimated at the cost of provision rather than market prices.

- If an Irish company sells €1 million worth of knitwear but domestic expenditure for this good is only €900,000, then there would be a discrepancy between the value of expenditure and output, i.e. $E \neq O$. This explains why **export expenditure** – foreigners’ spending on Irish goods – is

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2 The total figure on investment also includes changes in stocks, **circulating capital**, since any unsold goods produced in the time period are part of inventory and still represent output even though they have not been sold. Unsold and unfinished goods are accounted as expenditure by the firm. Say a firm produces €100,000 worth of Widgets but sells only €90,000 worth. If we counted only the expenditure the firm has received then actual periodic output would be underestimated by the additional Widgets valued at €10,000 now in the firm’s warehouse. This addition to stock must therefore be included in the accounts. Similarly, had inventory fallen by €10,000 then €10,000 must be subtracted, since total expenditure exceeds the actual amount produced in the time period. Circulating capital also includes the elements of completed work in long term projects, *works in progress*, such as airports and roads.
added, since we are estimating the total expenditure on goods produced in the country.

- In adherence with this, any expenditure by Irish on non-domestic goods must be deducted. This import expenditure does not represent any domestic output and represents a flow of money out of the system. Often one sees the term ‘net exports’ used, which is the product of export revenue minus import expenditure.

- We now arrive at GDP at market prices, which must be adjusted for two systematic inconsistencies; taxes and subsidies. Since we are measuring expenditure, most goods will include a proportion of indirect (expenditure) taxes, such as value-added taxes (VAT) and excise duties. Since these taxes do not have any corresponding output they must be subtracted. Subsidies skew the figures in the opposite manner, since the value of subsidies lowers the final market price below the actual factor cost. Therefore subsidies must be added on.

After, once again, adjusting for statistical errors we arrive at GDP at factor cost, which is the same value as in the income method used earlier. These two methods show the ‘flip sides of the coin’, as income in an economy must equal expenditure, which in one of the most common formulaic expressions is; \( Y = C + I + G + X – M \). We now finish with the method used to calculate the physical output in money terms.

**(Type 4 Medium heading) 3. Output method of accounting**

In calculating GDP using money values of total output one must be aware of the possibility of double counting, i.e. take measures not to count the same good twice. The issue of double-counting is important enough to warrant a brief example. Let’s follow a product, peat for gardening, through the process of manufacturing to final purchasing at an Irish gardening store. Assume at the initial end of the chain a landowner in County Cavan who has a few thousand acres of prime peat bog and at the other end of the chain a consumer who walks in to the flower shop to buy a bag of garden earth.³ To simplify the example, we will assume that there are only four stages in the transaction chain:

Stage I: The landowner, Paddy, sells the unprocessed raw bog – stripping rights – to Paddy, at the Soggy Bottom Peat Company for €10,000.

Stage II: Paddy at the Soggy Bottom Peat Company then cuts out cross sections of peat and dries it and sells it for €30,000 to…

Stage III: … Paddy & Paddy at The Leprechaun Garden Boyos, a garden wholesaler. The peat is carefully bagged and labelled with ‘Gnome-approved’ stickers and sold for €250,000 to…

Stage IV: … Paddy’s Gardening Emporium, which, after sticking on labels reading ‘Made from Gnome-friendly Irish peat!’ are sold during the year for €10 apiece, totalling €500,000 in retail sales.

It is quite possible that some of the customers are named Siobhan (pronounced ‘Shevaun’⁴).

**(Type 5 Smallest heading) Trick question:**

What is the total value of final output, i.e. GDP, in this ‘economy’?! If your initial impulse is to start adding the value of output at each stage – i.e. €10,000 plus €30,000…etc – then stop immediately and read on instead. Adding the output at each stage of production is exactly what we are trying to avoid, since we would be double-counting values at every stage. Figure 3.1.5 shows how the initial output of peat bog sold for €10,000 is purchased by the peat company and sold on for €30,000. The value of output at Stage I is €10,000 and at Stage II €30,000. However, the original €10,000 has been included in the output value of €30,000 at Stage II when it is sold on to the garden wholesaler – this €10,000 must be deducted in order to see the value of output which is linked solely to the Soggy Bottom Peat Company, i.e. the value-added of

³ I’ve received a few emails from students who had no idea what “peat” is. It is basically decomposing vegetable matter (“wannabe-coal”?) formed over millions of years and often found in marshy wetlands. It can be used for building material, fuel and garden soil.

⁴ Hey, don’t look at me. While my forefathers came from Ireland, I doubt that we invented the spelling.
€20,000. And so it continues on up the chain. Each consecutive stage buys the output of the previous link in the chain and adds value before selling it on. Total final value of output is the €500,000 paid at retail level by consumers – which is identical to the sum of all value-added through the chain; €10,000 + 20,000 + 220,000 + 250,000 = €500,000.

Figure: 3.1.5 Value-added in output method
Calculating GDP using the output method is commonly done by collecting the figures on value-added for firms. In actual fact, it is virtually impossible to measure output by attempting to count ‘final output’ in every industry. Imagine an economy comprised of three firms; an iron mine, a tool firm and a building firm. The iron goes to the tool firm. The tools go to building firm….and the building firm uses the tool to build a shed for the iron mine! Oh, and the mine buys tools from the tool firm. So, how does one calculate final output of each firm without double counting?! The answer is, one summarises total output value (equivalent to total sales revenue) for each firm and deducts the costs of factor use. This shows how much value each firm has added and figure 3.1.6 shows how GDP is arrived at using this method.
The methodology is fairly straightforward; value-added from all the various sectors comprising the economy are summed up and adjusted for financial services (which are interest payments that must be discounted in order to avoid double counting) and a statistical discrepancy. We get the same value of GDP as in the previous two cases.

Finally, the importance of avoiding double counting brings me to one of the most common misuses of
economic principles, namely the insistence of a good many laymen and even well-regarded economists in comparing the revenue of multinational companies (MNCs) with the national income of selected countries. This muddled and rather misguided comparison is ostensibly an attempt to show the ‘power’ of MNCs in comparison with – and often put in terms of ‘at the expense of’ – less developed countries.

POP QUIZ 3.1.1: GDP ACCOUNTING METHODS

1. Explain why the value of final output must be equal to the sum of value-added.
2. Why do we deduct transfer payments when calculating GDP?
3. Calculate GDP from the following figures: Consumer expenditure = €15 bn, general government final consumption = €8 bn, gross domestic investment = €6 bn, value of total exports = €3 bn, value of total imports = €4,5 bn, capital consumption (depreciation) = €2,5 bn.

- From GDP to GNP

As usual, one can go a long way by simply ‘tasting’ the terms. We have so far computed the flow of income and expenditure created within a country, GDP, where the ‘domestic’ part should give you a clue. GDP is the output created within the economy using domestic factors of production. However, not all of this output is created by domestic companies since there will be a proportion of foreign-owned enterprises operating within the economy. In addition to this, domestic companies will hold foreign assets in the form of subsidiaries and joint-owned companies abroad. Both will lead to in- and out-flows of income (profits, wages, interest and rents) in each country. A country will receive income from property held abroad (subsidiaries and wholly owned businesses) and will pay property income abroad. By taking into account this net property income from abroad to and from the foreign sector, we get gross national product, GNP.

**Definition: Gross national product (GNP)**

GNP is an account of the money value of goods and services produced within an economy regardless of domestic or foreign ownership of the firms. GNP takes into account foreign ownership in the economy and domestic ownership of firms abroad by adding on net property income from abroad.

\[
\text{GDP + property income from abroad – property income paid abroad} = \text{GNP} \quad \text{…or…} \\
\text{GDP + net property income from abroad} = \text{GNP}
\]

To summarise:

- Gross **domestic** product means ‘produced within a country’s boundaries’. These are goods resulting from home-based assets – regardless of whether they are owned domestically or by foreigners. GDP is thus delineated by country boundaries; ‘Where (produced) – not who (owns)’!

- Gross **national** product on the other hand, means ‘produced using a given country’s factors’ – regardless of where. GNP deals with ownership originating in a certain country; ‘Who (owns) –
not where (produced)!' In the next section, we will look a little closer at the question of which measurement constitutes the ‘best’ indicator of economic performance.³

- **Nominal and real GDP**
As GDP is comprised of millions of different goods it would be virtually impossible to measure it in actual quantities of the goods produced which is why it is put in money terms. The problem with using money as a measurement is, of course, that the value of money continuously changes – there is inflation. One unit of a currency does not buy the same amount of goods if prices have increased. And since we measure GDP using money terms, the value of output has been inflated by the increase in prices because output is calculated by taking the quantity times the price for all units of output.

Understanding the difference between real and nominal is very important in economics. Generally speaking, economists tend to avoid nominal values since real values tell us so much more. The term ‘nominal’ means ‘face value’ or ‘money sticker price’, while ‘real’ is a way of comparing the nominal (face) value with a given **base value** to see what the actual change is. Putting nominal values into real terms is also known as using **constant prices**, i.e. output valued at a price level of a given – base – year.

If output in 2000 is 100 Widgets at a value of €50 then **nominal** output is €5,000. Now, if we call the year 2000 our **base year** (or period) then this is the period we will refer to when comparing all other values; this means that the base year nominal value is also a real value, since all coming output values will be put in terms of base year prices. So, if 110 Widgets are produced in the next time period at a value of €55, nominal output would be €6,050, which is an increase of 21%. Yet clearly real output has only increased by an additional 10 Widgets, i.e. 10%. What we must do is **deflate** the nominal value by removing the inflationary element in order to show real output in the second time period.

While the consumer price index (CPI) is the most commonly referred-to measure of inflation, it is too narrow for general use in macroeconomic models. This is alleviated by using another index of the price level, the **GDP deflator**, which includes all goods accounted for in GDP. Since the CPI only includes consumer goods, a great deal of important prices are left out, notably those for investment goods, government goods and exported goods. The GDP deflator is calculated using the same basic principles as in the CPI, but includes prices on all these types of goods in the economy rather than just consumption goods. It is this wider definition of the price level we use to arrive at real GDP and real GNP. So, let us assume that in factoring in price changes for I, G and X we get the following GDP deflator series:

![Figure: 3.1.12 The GDP deflator](image-url)

³By now you should know that the answer will start with “It depends. Assume the following…”
Dec 1995 \( (t_0) \)  & Dec 1996 \( (t_1) \)  & Dec 2001 \( (t_2) \) \\
CPI_{t_0} = 100  & CPI_{t_1} = 102  & CPI_{t_0} = 119  \\
…plus I, G and X goods  & …plus I, G and X goods  & …plus I, G and X goods  \\
= GDP deflator 1995; 100  & = GDP deflator 1996; 102  & = GDP deflator 2001; 128.5 \\

The GDP deflator shows that the average price level of all goods and services in the Irish economy has increased by almost 30% during the period 1995 to 2001, far more than the 19% shown by the CPI. Keep in mind that our “basket” is a representation of the average change in price rather than a change in all prices!

Polishing off the example above, Ireland had the following GDP figures in current (i.e. nominal) values; 1995 = €52,641 bn; 1996 = €58,080 bn; and 2001 = €114,744 bn. Notice that national income looks to have more than doubled in a six year period! However, by using the GDP deflator series in figure 3.1.12 to deflate these figures, we remove the ‘pumped up’ component, which is to say the inflation element included in the nominal figures. (See figure 3.1.14).

Deflating nominal GDP is done by using essentially the same formula as before, but using the GDP deflator as the general price index rather than the CPI:

\[
\text{GDP real} = \frac{\text{GDP nom of year}}{\text{GDP deflator}} \times 100
\]

Nominal GDP: 
- year 1995 = €52,641 bn  
- year 1996 = €58,080 bn  
- year 2001 = €114,744 bn.

GDP deflator: 
- 100  
- 102  
- 128.5

Real GDP: 
- year 1995 = €52,641 bn  
- year 1996 = €56,891 bn  
- year 2001 = €89,320 bn

(Rory: more € signs…..)

Adjusting the current (nominal) values for the increase in general price level \( ([\text{GDP}_{\text{nom}} \text{ at year measured} / \text{CPI at year measured}] \times 100) \) we get the following real GDP figures illustrated in figure 3.1.14 below. This is the ‘shrinking balloon effect’ of deflating nominal values into real values.

(Rory: this is a tad messy. Still issues with €.)

\(^6\) I have rounded the figures a bit.
After adjusting the nominal figures for inflation and thus putting them into base year values, we see how a portion of nominal GDP was in fact comprised of increasing prices rather than increasing output. After deflating these values we get a GDP series showing output in constant year 1995 prices. This is real GDP in terms of base year values of output.

**Figure: 3.1.15 Nominal and real GDP in Ireland, 2001 (billions of € at constant 1995 values)**

<table>
<thead>
<tr>
<th></th>
<th>Nominal GDP</th>
<th>114,744</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Deflated using GDP deflator (index)</td>
<td>128.5</td>
</tr>
<tr>
<td>3</td>
<td>Equals: Real GDP</td>
<td>89,320</td>
</tr>
</tbody>
</table>


In summa; real Irish national income increased by almost 70% during the period 1996 – 2001, which is less than the over 100% which nominal income suggests, but still one of the highest growth rates in the industrialised world during this period. Just imagine that you were an “average” Irishman and that your personal income kept pace with the real GDP – you would be able to buy 70% more goods with your income. And since price indexes have a marked tendency to understate real output by not taking into
account quality increases and availability of substitutes, real GDP in all probability increased by more than 70%.

- **Per capita income**

National income is also often put into terms of ‘average income per person’, which is nothing other than **GDP divided by the population**. This is income per capita (= GDP or GNP per head). Irish nominal GDP in 2001 was €114,744, and dividing by the population gives us €29,889; this is Irish GDP per capita. **Figures 3.1.16** and 3.1.17 below follow the Irish figures used throughout this section.

**Figure: 3.1.16 Summary of national income accounting – Ireland in 2001**

1) Gross domestic product (GDP) = €14,744 billion
   plus net property income from abroad
   – €8,295
2) = Gross national product (GNP) = €96,448 billion
   minus depreciation
   – €11,619
3) = Net national product (NNP) = €84,829 billion

Nominal GDP/GNP adjusted for inflation*

4) Real GDP = €89,320 billion
5) Real GNP = €74,318 billion

Divided by population:

6) GDP per capita = €29,889
7) GNP per capita = €25,123

* Base year is 1995 - so all real values are in constant 1995 EUROs.

I offer you a piece of advice here: **Beware of averages!** Bill Gates did a world tour in 2003 of developing countries in furtherance of the Gates Foundation. Find a picture of Gates sitting with a few hundred villagers and then calculate the average income of the group! See my point? The lesson is simple; the more divergence between the maximum and minimum values, the weaker the arithmetic average is. Whether looking at real or nominal GDP or GNP per capita it is essential to keep in mind that income distribution can be such that a small proportion of the population accounts for most of the income. This doesn’t show in per capita GDP/GNP figures.

**POP QUIZ 3.1.4: NATIONAL INCOME ACCOUNTING**

1. Why might an LDC have higher GDP than GNP? Why might Singapore?
2. What is the sum of global net property income from abroad?
3. A Volkswagen Polo cost SEK (Swedish Crowns) 65 000 in 1985 and SEK 113 000 in 2000. CPI in 1985 was 154 and 258 in January 2000. What is the real price of the Polo in 1985 and 2000 respectively using 1980 as the base year? Any weakness in comparing prices like this?
4. In a country, you have the following figures: GDP = 600; property income paid abroad = 120; net
property income from abroad = 30; capital consumption = 60. What are the values of GNP and NNY?

5. Let us say that in 1987 the CPI is 220 and the same year nominal GDP is €600 bn. In 1999 the CPI is 330 and nominal GDP is €900 bn. How has this country fared in terms of real output (= real GDP).

6. Over a 10 year period, the following happens; GNP (nominal) increases by 25%, population remains unchanged, CPI goes from 150 to 200. How has this affected nominal GNP per capita and real GNP per capita?

7. Refer to the figures below. During which period does the rate of inflation fall first?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prices</td>
<td>97</td>
<td>105</td>
<td>106</td>
<td>105</td>
<td>103</td>
</tr>
<tr>
<td>Wages</td>
<td>100</td>
<td>105</td>
<td>110</td>
<td>112</td>
<td>109</td>
</tr>
</tbody>
</table>

8. Explain how ‘double counting’ can occur in calculating national income, and how measuring ‘value-added’ can overcome this problem.

9. GDP figures for a country are as follows: USD 200bn in 1989; USD 230bn in 1990; and 260bn in 1991. What are the growth rates? Are they rising, falling or constant during this time period?

10. Over a period of time, the GDP index in an economy goes from 100 to 120 while the population index goes from 100 to 130. What could one deduce from this in terms of average national income? What is missing in order to be able to comment on the change in real income?

• **Use of national income figures** (and eval – e.g. weaknesses)

‘I have observed that we all get the same amount of ice. The rich get it in the summertime and the poor get it in the winter.’ Bat Masterson

It is extremely important to understand the uses of growth and GDP figures and also the limitations. The figures are useful for assessing how well the economy is using resources and how the economic system compares to other countries. The figures are also invaluable in showing possible government policies and future government tax revenue and thus how well pensions, schooling and infrastructure will be covered. Having said this, it is vital to realise that GDP and growth figures do not show how the environment is impacted, whether the increased wealth has been relatively evenly distributed, whether people can actually buy more goods for their money or whether general welfare in the society has increased correspondingly. Taken together, one should always try to use a critical eye and ‘look behind’ the actual numbers.

**(Type 3 Medium heading) Comparison in a single country over time**

There are a number of criticisms levelled against GDP figures when they are used to show growth within a country over time. Three main points emerge:

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7Legendary gunfighter in the ‘Old American West’.
1. **Money values and population change:** We have shown how changes in price levels and population can skew income figures and how this can be dealt with by putting all figures in constant and/or per capita values. However, there is still quite often a…

2. **Quality and substitution bias:** Which goods are included in the basket which is compared over time? Price indexes frequently *overestimate inflation* and thus underestimate real output growth over time due to the fact that when aggregate demand changes permanently over time there has been a shift to other, superior, goods; *substitutes*. This causes an overestimation of the price level since a downshift in production of goods on the way to becoming obsolete (= outdated) reduces the possibility of benefits of scale and keeps costs and prices higher than for new goods not yet included in the basket. Similarly, GDP figures cannot estimate the *increased quality* of new goods, for example the fact that newer cars need less service and maintenance and use less fuel. Thus, there is a bias in overestimating actual price increases by underestimating the quality of new goods substituting old goods.

3. **Errors and/or changes in accounting methods:** Imagine the hundreds of millions of figures entering into the overall calculation of national income during a year – there are bound to be both *accounting errors* and time lags in assessing all the data. It is also often the case that older data is less comparable with newer, due to different methods of accounting.

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(Type 3 Medium heading) **Comparing GDP between countries**

In addition to the above, a number of weaknesses in national income figures become apparent when different countries are compared. These include (but are not limited to!):

1. **Composition of output:** Perhaps the main criticism of GDP as a measure of welfare is that however accurate the figures are for output, the final GDP figure does not show what is being produced – we’re back to a ‘guns or butter’ problem. The Soviet Union of the 1930s put great effort into competing with the west in terms of output and growth in order to show the superiority of the centrally planned system. Going by official output figures the USSR won the race, but what the figures do not show is that the Soviets put the majority of resources into producing capital goods – and never really got around to providing for the wants and needs of its citizens in terms of consumer goods. A country with double digit growth rates and empty shelves is something of an anomaly but quite possible, which is also often the case in times of major conflicts when armaments account for economic growth which in no way represents an increase in the standard of living.

2. **Composition of expenditure:** In a vein similar to the above, national income figures are often skewed by the simple fact that different countries will have different expenditure patterns. The cold and icy Nordic countries spend a sizable proportion of their income on heating homes and offices – but this doesn’t mean a higher standard of living than in temperate climate. Comparing Finland’s GDP figures with Bermuda’s could get tricky indeed.

3. **Distribution of income:** All per capita national income figures are *averages* and therefore neglect how income is distributed amongst citizens. The third richest country in the world, the USA, had a per capita GDP of USD35,200 in 2000 while the second richest, Norway, had USD37,200. Yet the highest 10% of all income earners in America accounted for 30.5% of national income – and at the same time the country had some 30 million people living below the official poverty line. In Norway, on the other hand, 21.8% of income went to the richest 10% – thereby accounting for one third less than the USA’s richest upper deciles.

4. **Unaccounted-for activity:** Statistical inaccuracies will be enhanced by the fact that a portion of economic activity will be hidden; *parallel markets* for goods and labour are notable examples of a

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*National Accounts of OECD countries, Main aggregates, Volume 1, updated version from 2003*
*Poverty in the United States, US Census Bureau 2000, page 3*
type of systematic error since real output is consistently under-reported. The large element of barter and non-money economic activity in LDCs will lead to consistent under-reporting of real output figures. More developed countries will also have a large section of unreported activity, but in this case primarily due to tax avoidance and evasion of labour laws.

Note: large parallel markets can seriously underestimate economic activity. For example, unreported national income on a global basis amounts to almost 31% of the world’s GDP. The range is from 9% of GDP in the US to over 70% in Bolivia and Georgia. Indonesia is estimated by the OECD to have a parallel market of close to 80% of all economic activity. Such figures seriously undermine the validity of national income accounting figures.

5. **Exchange rates distortions:** Since the comparison of different countries’ GDP must be put into some form of common language, a single currency is used, often the USD. In doing this, the market exchange rates for different currencies are used – with the unfortunate side effect of grossly underestimating average incomes of low cost countries when purchasing power is taken into account. See purchasing power parity (PPP) below.

6. **Externalities and environmental damage:** GDP figures do not show soil erosion, air pollution, land degradation, deforestation, depleted natural reserves of resources or the often monumental disruptions to values and traditions as a result of large scale economic growth in a relatively brief period of time.

In spite of the heavy criticism levied above, GDP per capita adjusted for purchasing power (see below) is still the best ‘single’ indicator of development available. There is relatively clear positive correlation between most standard of living indicators and economic growth – the problem being that it is very difficult to see which comes first, i.e. there is a causality problem.

- **Green GDP (what the hell...)**

There have been several efforts to factor in the external costs of production into country wide figures of output; “green GDP accounting”. The latest effort was done in China during the period 2005 to 2007 – the hitherto only effort at green national income accounting. No official figures were published. If it ever takes off I shall include it here. Watch this space.

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Summary and revision

1. **GDP** is accounted for via three methods; the **output method** (sum of value-added in an economy); the **income method** (sum of wages, rents, interest and profits); and the **expenditure method** (sum of consumption expenditure, investment, government spending, and net exports).

2. **GNP** is GDP plus *net property income* from abroad.

3. “**Domestic**” means “…produced within a country’s borders..” and disregards who owns the factors. “**National**” looks instead at “…who owns the factors – regardless of where production takes place…”

4. **Real GDP** (or GDP at constant base year values) is nominal GDP adjusted for inflation. To calculate real GDP, divide nominal GDP by the GDP deflator (a broad price index) and then multiply by 100. (Rory, could you put the formula here please?)

5. **Per capita GDP** or GNP is calculated by dividing GDP or GNP by the population.

6. National income figures are used to compare the overall “success” of an economy with others and to provide statistical material for governments to base future decisions on.

7. There are several **weaknesses** of national income accounts:
   - Changes in population and money values skew the figures
   - New and better products are not represented in the money-value-of-output figures in GDP/GNP
   - Simple calculating errors are all too common
   - What is produced is not shown in the figures – e.g. composition of output is not reflected in a GDP value
   - National income per capita is an average and does not show income distribution
   - Many economies have large unaccounted-for sectors in the economy – so called parallel markets
   - Exchange rates tend to distort comparisons between economies
   - Environmental impact of production is notoriously missing (and difficult to estimate!) from GDP/GNP figures