Macroeconomic accounts

Gross Domestic Product

[*Apples and oranges per year grown here*]

Three Definitions of the Gross Domestic Product (GDP)

[*Two sides to each transaction allow cross-checks of totals*]

i) sum of the final sales
ii) sum of value added
iii) sum of factor incomes

Distinctions:

- Stock vs. flow
- Final vs. intermediate sales
- GDP vs. GNP

What measures and what not:

- market transactions, sales prices,
- Not happiness, quality of goods, pollution, environmental damages
- Used goods (not in GDP) – transfer of ownership
- Valuation of public services at cost of production

Real versus Nominal, Deflators versus Price Indices

[*We spend € on fruit, but we still consume kg of bananas*]

Expenditure totals are what we actually observe, which are sums of value products (price times quantity) of individual items. The problem is one of decomposing a change in an expenditure total into the part due to changes in prices ("on average") and the part due to changes in quantities ("on average").

The **deflator** is a ratio:

GDP deflator = nominal GDP/real GDP

The growth of the deflator is a difference.

GDP deflator inflation = growth rate of nominal GDP - growth rate of real GDP

Euro area: annual rates of growth

	Nominal GDP	Real GDP	GDP deflator
1990	7.7	3.0	4.7
1991	8.8	1.6	7.2
1992	4.3	1.1	3.2
1993	0.3	-0.5	0.8
1994	5.0	3.0	2.0
1995	3.9	2.4	1.5
1996	5.1	1.8	3.3
1997	5.4	2.7	2.7
1998	4.6	2.9	1.7
1999	4.6	2.1	2.5

Table 2.1

One sees how looking at nominal GDP growth rates gives an "inflated" view of the magnitude of the growth of the rate of annual production. Indeed prices have increased faster than quantities in a majority of the years in the table.

Consumer price index (hold quantities in a "market basket quantity" and value that same market basket in each period's prices.)

As Figure 2.1 shows for Italy, the GDP deflator and CPI do not give exactly the same picture, but they clearly move fairly similarly over longer periods of time.

Figure 2.1

Both the GDP deflator and the consumer price index (CPI) measure the price level, or the price of goods in terms of money. They are used to compute an economy's inflation rate.

The figure shows that both inflation rates tend to move together over time, with occasional exceptions when the difference in the underlying "baskets" makes a difference. In 1986, world oil prices went down sharply. Since gas and heating oil are part of household consumption, inflation measured by the CPI declined. Oil being imported (so it does not create value added in Italy) has only a small impact on the GDP deflator.

Laspeyres index (fixed quantity weight as seen in the typical CPI) and **Paasche index** (moving quantity weight as is implicit in the GDP deflator). Both formulas involve the pricing of reference market basket of goods at different sets of prices.

Measuring and Interpreting GDP

[*Take three grains of salt with your national income accounts*]

- First point is that it is a hard business getting accurate GDP estimates. On the one hand, largely for tax avoidance reasons, there is market production taking place that is unreported (Table 2.2).

Size of the underground economy: estimates

(% of GDP)

Africa		**Central Europe**	
Nigeria, Egypt	68-76%	Hungary, Bulgaria, Poland	20-28%
Tunisia, Morocco		Czech Republic, Romania, Slovakia	9-16%
Latin America		**Formet Soviet Union**	
Mexico, Peru	40-60%	Belarus, Georgia, Ukraine	28-43%
Chile, Brazil, Venezuela	25-35%	Baltic States, Russia	20-27%
Asia		**OECD**	
Thailand	70%	Belgium, Greece, Italy, Spain, Portugal	24-30%
Philippines, Malaysia, Korea	38-50%	All others	13-23%
Hong Kong, Singapore	13%	Austria, Japan, USA, Switzerland	8-10%

Source: Schneider and Enste (2000)

Table 2.2

The fact that GDP figures are in part collected through tax returns immediately raises the suspicion that individuals and firms may be less than candid about their finances to the fiscal authorities. Such unreported incomes form what is referred to as the ***underground economy.***

- There is also a lot of economic production that goes unreported not because there is anything illegal or even unusual but because it stays within the household and never even sees the market (Table 2.3)

Unpaid work: The Netherlands, 1990

	Average paid work	Average unpaid work
Hours per week		
Men	32.6	17.5
Women	9.4	39.8
Percent of GDP		36-58%

Source: Bruyn-Hundt (1996)

Table 2.3

Another serious limit to GDP measures is unpaid work. Fixing the house and caring for the family and cleaning around take up much time and effort. Wealthier people hire help for these chores, in which case it becomes part of GDP (if reported to the tax authorities). Most people do it themselves, and it is unrecorded. Table 2.3 presents estimates for the Netherlands of the size of this "lost output". The first part shows that women perform much unpaid work. The second part shows that unpaid work represents a sizeable part of official GDP. The estimates depend on which salary we impute to this activity, the lowest figure corresponds to the minimum wage, the highest to the average wage.

- Finally old GDP numbers might make economic historians happy but getting hot and fresh GDP numbers for the immediately preceding past period(s) requires estimates based upon still incomplete returns (similarly to forecasting the winner of an election based upon some fraction of the reporting precincts). Table 2.4 shows how misleading such preliminary returns can be.

Various estimates of French GDP for 1986

Date of publication	GDP bn current FF	% difference from previous years	% difference from June 1987
June 1987	5,015.9		
Sept. 1988	5,034.9	+0.4	+0.4
Sept. 1989	5,052.5	+0.3	+0.7
June 1990	5,069.3	+0.3	+1.1

Table 2.4

The first estimate, published six months after year end, fell short of the latest figure by more than 1%! This may not seem like much, but it amounts to a full 15% difference for the actual growth rate recorded that year (7.5%).

Flows of Incomes and Expenditures

[*If economists were hydraulic engineers…*]

The Circular Flow Diagram

[*Wheel of wealth*]

- The point of national income and product accounting is to gauge the volume of the flow of real goods and services based upon observed flows of spending.

- We collectively earn to collectively spend.

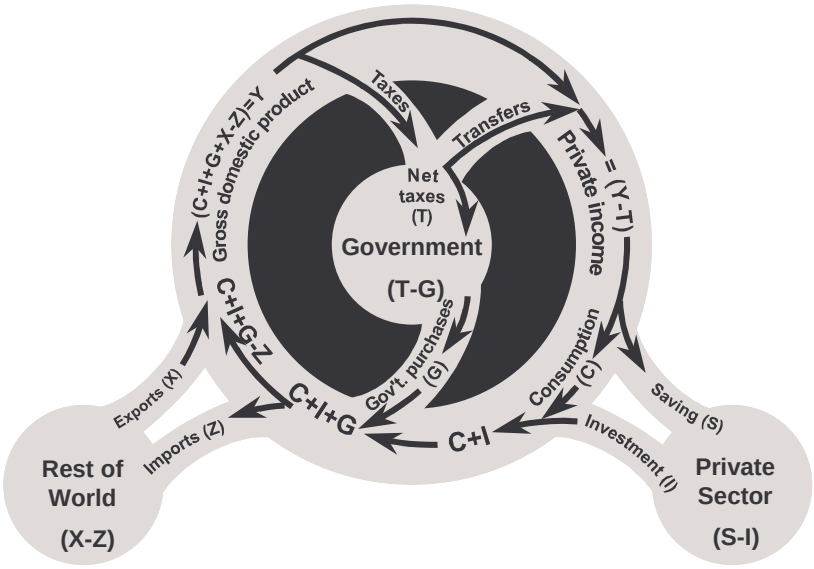


Figure 2.2

The lower left part of the wheel represents sales of domestically produced goods and services, the sum of consumption spending (*C*), investment spending (*I*), government purchases (*G*), and exports (*X*) less imports (*Z*). In the upper left part of the wheel this is interpreted as income to residents. This income is taxed by the government, which also pays out various transfers. What is left, private income, may be saved (*S*) or spent (*C*). This circularity is the essence of economic activity: we (collectively) earn to (collectively) spend. The private sector borrows to invest in productive equipment (*I*). The balance $S - I$ is the private sector's net saving behaviour. The balance T – G is the public sector borrowing requirement. X – Z represent the country's net exports.

Summary of the Flow Diagram
[*Product uses and income leaks*]

There are two decompositions of GDP. Net final sales, the GDP is broken into four main categories sales of consumption goods and services (C), sales of investment goods and additions to stocks (I), sales to the government (G) and sales to the rest of the world (X). Since part of domestic income leaks abroad to pay for imported goods, imports (Z) must be subtracted, which gives the first decomposition of GDP:

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

GDP can be also viewed as net incomes earned by factors of production. What do they do with their income? They pay taxes net of transfers (T), they save (S) and they consume (*C*). Hence the second decomposition:

$$Y = C + S + T$$

Table 2.5 presents components of the first decomposition as a percentage of GDP for few countries.

Components of GDP
(avg. of quarterly data 1970-98, % of GDP)

	Consumption (C)	Investment (I)	Government purchases (G)
Australia	57.8	23.5	18.7
Germany	56.2	24.4	19.4
France	59.9	22.2	17.7
UK	62.2	17.0	20.8
Italy	62.0	22.0	16.0
Japan	57.9	32.7	9.4
Canada	57.8	22.4	19.7
Switzerland	60.1	26.2	13.7
USA	64.9	14.7	20.4

Table 2.5

Total national spending or absorption is the sum, C+I+G. Note that investment this period will have an impact on the stock of capital available next.

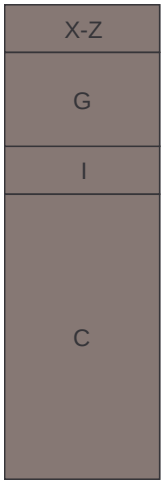
More Detail
[*National accounts strip tease*]

GDP and household disposable income, 2000
(€ bn)

	GDP	Household disposable income	
		Level	% of GDP
Germany	2052	1212	**59.0**
France	1407	846	**60.2**
Sweden	246	119	**48.2**
Switzerland	260	140	**53.9**
United States of America	10730	7093	**66.1**
United Kingdom	1549	917	**59.2**

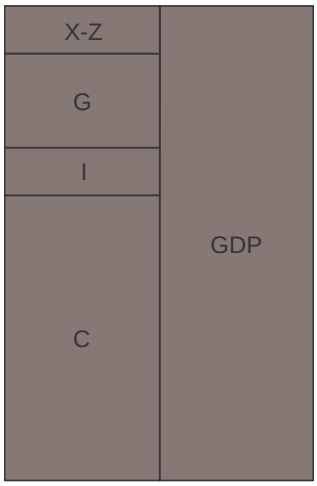
Table 2.6

While GDP represents the collective income earned within a nation's boundaries, not all of it ends up in the hands of individuals. What households actually receive to spend or save is called **personal disposable income**. Some 30%–40% of GDP does not reach individual households. It either goes to the government (net taxes) or is saved by firms (retained earnings).



We begin by adding up (i.e. aggregating) all expenditures on final goods and services produced domestically

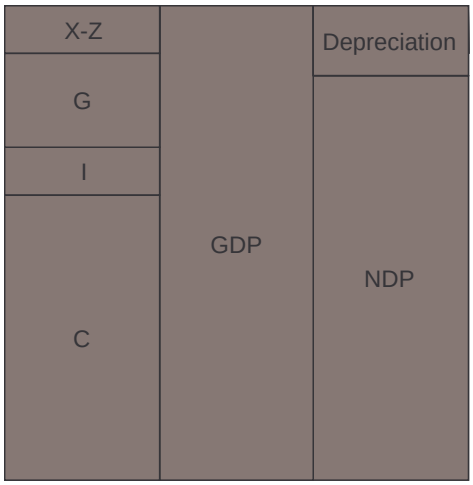
Figure 2.3 (a)



This sum is defined as the gross domestic product

Figure 2.3 (b)

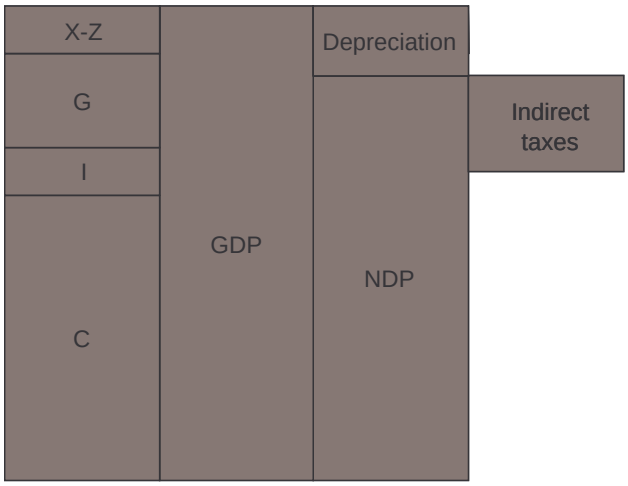
This corresponds to about 10 o'clock on the circular flow diagram.



We deduct depreciation to obtain net domestic product

Figure 2.3 (c)

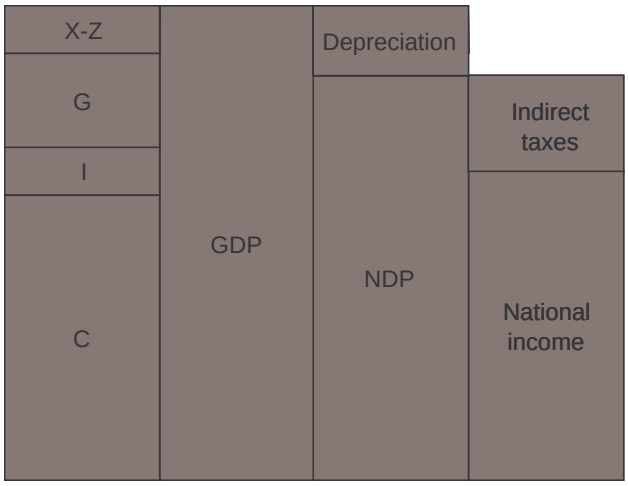
The deduction for depreciation is best understood as analogous to that of a farmer who deducts the seed corn he needs to maintain his current production level and what is left over (here NDP) he can sell in the market which will be his income.



Market prices are different from factor costs due to indirect taxes (and subsidies)

Figure 2.3 (d)

Remember we are going from value of output to the income that is ultimately distributed to the factors of production. The next deduction is the net indirect taxes (essentially sales taxes less the value of subsidies paid by government that permit a company to stay in business with prices that do not fully cover costs).



National income is what is distributed to the factors of production

Figure 2.3 (e)

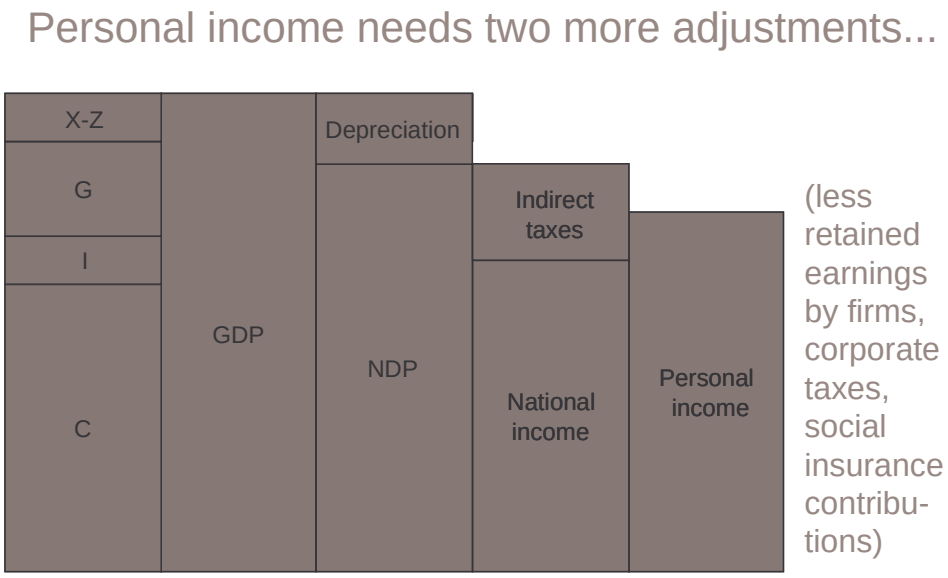
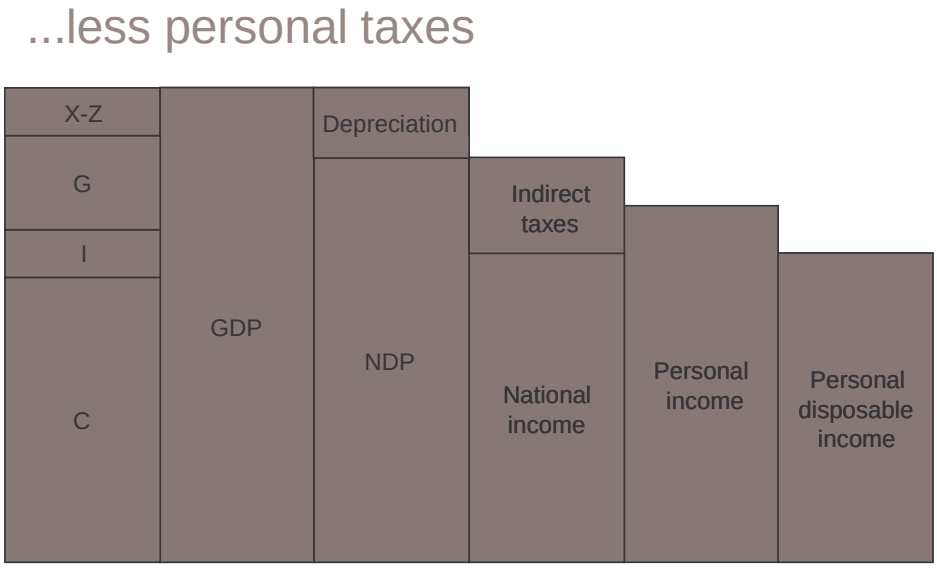


Figure 2.3 (f)

The government also transfers income to households (unemployment benefits, disability payments, health care reimbursements, family allowances). The result is PERSONAL INCOME.



Figur 2.3

And we get PERSONAL DISPOSABLE INCOME.

...which can be used for consumption or saving

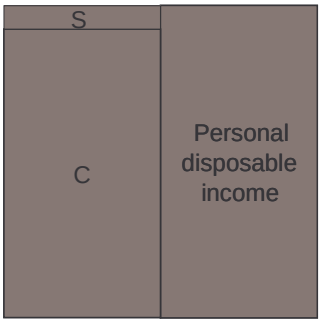


Figure 2.3 (h)

A Key Accounting Identity
[*Linking Leakages*]

The two decompositions of GDP are accounting identities: they hold by definition.Therefore it is always the case that:

$$\underbrace{\underbrace{C+S}_{\text{private}}+\underbrace{T}_{\text{public}}}_{\text{claims on the income}} = Y = \underbrace{C+I+G+(M-Z)}_{\text{uses of the product}}$$

Rewrite:

$$\underbrace{(S-I)}_{\text{net saving leakage}}+\underbrace{(T-G)}_{\text{leakage from gov't budget surplus}}=\underbrace{(X-Z)}_{\text{net exports}}$$

The accounting identity in 1999 (% of GDP)

	S-I	*T-G*	*CA*
USA	-4.7	1.0	-3.7
Japan	10.3	-7.6	2.7
European Union	2.8	-2.5	0.3
Belgium	4.2	-1.0	3.2
Denmark	-3.2	2.9	-0.3
France	4.6	-2.2	2.4
Germany	-1.6	1.6	0.0
Italy	2.9	-2.3	0.6
Netherlands	4.2	-0.6	3.6
Spain	0.3	-1.4	-1.1
Sweden	-0.6	2.3	1.7
UK	-2.2	0.7	-1.5

Table 2.7

In the USA the private sector is dissaving, spending more than it earns, by a large amount. The public sector's surplus is too small to compensate, so the country as a whole is running an external deficit. The situation is exactly the opposite in Japan. The private sector's massive surplus swamps the public sector's deficit, leaving the country with an external surplus. The European Union as a whole is behaving more like Japan, but the internal imbalances are smaller and about cancel each other to deliver near external balance.

Identities versus Economics

[*Accounting is not economics*]

$$(S - I) + (T - G) = (X - Z) \text{ or equivalently.}$$

$$(S - I) = (X - Z) - (T - G)$$

- Suppose the left hand side is positive. Nothing in the equation tells us how the four items on the right hand side are expected to adjust so that the right hands side turns out to be positive.
- The particular identity is the result of the fact that one economic agent's payment is another agent's receipt and that the claims to income produced by the economy necessarily sum to 100%.