Chapter 20

The Measurement of National Income

National Output and Value Added

Production occurs in stages –
• many firms produce outputs that are used as inputs by other firms.

Intermediate goods (and services):
• outputs of firms that are used as inputs by other firms

Final products:
• outputs that are not used as inputs by any other firms

Value Added:

- measures each firm's contribution to total output

- the amount of market value that is produced by that firm.

Value Added = Revenue – Costs of Intermediate g & s

e.g.
- company buys iron ore for $200
- produces steel that it sells for $500

- iron ore is the intermediate good
- steel is the output

Steel company's value added is $500 - $200 = $300

Total value added for a product = final selling price of the product.

Example:

Product	Selling Price	Value Added	
Cotton	$2	$2	
Cloth	$5	$3	($5 - $2)
Shirt	**$20**	$15	($20 - $5)
Total Value Added		**$20**	

Shirt sells for $20, and sum of value added ($2 + $3 + $15) equals $20.

Also, Value added = Income to Factors of Production

Total value added in the economy is **Gross Domestic Product (GDP):**

- measure of all **final** output that is produced in the economy, valued at market prices

- Adding up value added avoids **double counting**

- Must not add up each firm's output – overestimates GDP

  e.g. adding up cotton, plus cloth, plus shirt overestimates value of production – prices of cotton and cloth are included in price of shirt.

National Income Accounting: The Basics

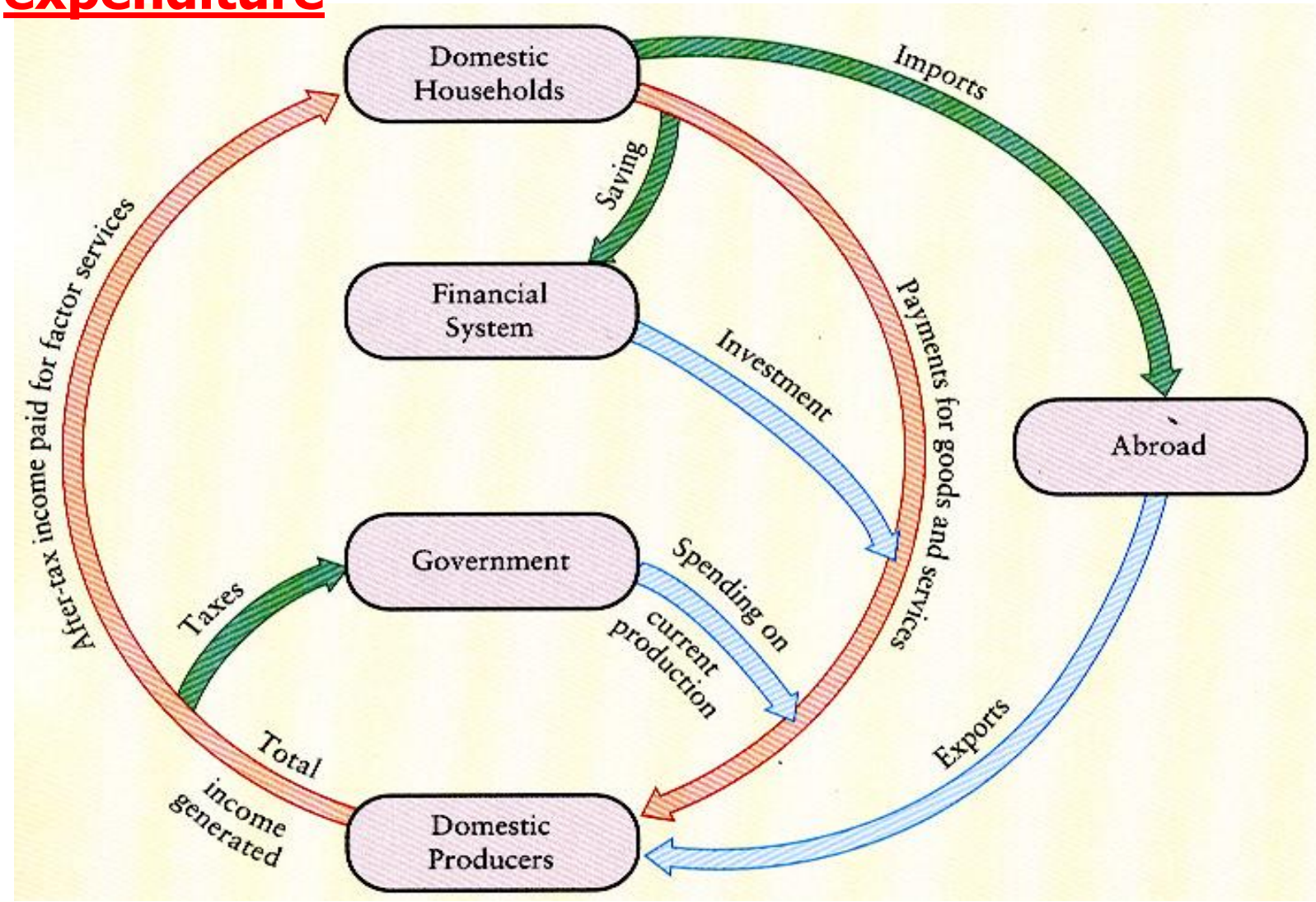
Three different ways of measuring national income:

- add up the total value added from domestic production
- add up the total expenditure on domestic output
- add up the total income from domestic production

The circular flow of income
- yield 3 measures of

Gross Domestic Product (GDP)

The circular flow of national income and expenditure



GDP from the Expenditure Side

- Add up expenditures needed to purchase final output produced (in year)

Four expenditure categories:

1) Actual **consumption expenditure (C):**

- expenditure on all final consumer g & s in year

2) Actual gross **investment expenditure (I):**

expenditure on g & s not for present consumption, including:

- new plant and equipment (additions to capital stock), also called business fixed investment
- inventory accumulation
- new residential construction

[**I**] used in two ways:

- **replacement** investment
  - investment to cover depreciation (or capital consumption)
  - maintains existing capital stock

- **net** investment
  - addition to capital stock

Gross I = Depreciation + Net I

Since all of **Gross I** is new production it is included in **GDP**

3) **Government purchases of g & s (G):**

- does not include transfer payments, e.g. pensions

Government output must be measured by cost since

- no market price
- no market value of output

  e.g. cost of policing

(If fewer police do the same job, measure of **G** falls, although output is the same.)

4) **Net exports: NX = (X - IM)**

Exports (X):

- purchases of Canadian-produced g & s by foreigners
  - part of the total expenditure on Canadian output

Imports (IM):

- purchases of foreign-produced g & s by Canadians
  - not spent on Canadian output
  - subtract it from total expenditure

GDP = C + I + G + X - IM

Aggregate expenditures in 2005:

Category	$billion	% of GDP
Consumption	$761.9	55.7
Investment	254.4	18.5
Government purchases	297.6	21.7
Net exports	54.3	4.0
Statistical discrepancy	0.7	0.0
Total	**1368.9**	**100.0**

GDP from the Income Side

GDP is the sum of **factor incomes** plus indirect taxes (net subsidies) plus depreciation.

Factor incomes include:

- **wages and salaries** (total payment for services of labour)
- **interest** (e.g. from banks and loans to businesses)
- **business profits** both
  - distributed (e.g. dividends)
  - undistributed (retained earnings)

Sum of these factor incomes is **net domestic income at factor_cost**.

To get to market prices add in "non-factor" payments:

To move from **factor to market prices**: add
- indirect taxes (e.g. sales taxes) less subsidies

To move from **Net to Gross:** add

- depreciation of physical capital (firms subtract "capital consumption allowance" before calculating net profits)

Must add these back to get the true value of production.

GDP from income side equals:

GDP = Net domestic income at factor cost +

indirect taxes (less subsidies) +

depreciation

2005 GDP Category	$billion	%
Wages, salaries and extra income	678.9	49.6
Interest and miscellaneous investment income	61.2	4.54
Business profits (including net income of farmers and unincorporated businesses)	293.1	21.4
Net Domestic Income at factor cost	1033.2	75.5
Capital consumption allowance	181.4	13.3
Indirect taxes less subsidies	154.7	11.30
Statistical discrepancy	-0.4	-0.0
Total	**13682.9**	**100.0**

GDP and GNP

GDP

- measures **total output produced in Canada** and
- total income earned from that production

e.g. includes profits earned by foreigners on investments in Canada

GNP

- measures the **total income received by Canadian residents**
- no matter where income generated

e.g. includes income earned by Canadian residents on investments abroad

GDP

- better measure of domestic economic activity

GNP

- better measure of the economic well-being of country's residents

Another important measure:

Disposable Personal Income

[**DPI**] = **GNP** minus

any part not actually paid to HH

- personal income taxes paid by HH

plus:

- transfer payments received by HH

Real and Nominal GDP

- Total GDP, valued at **current** prices, is **Nominal GDP**
- GDP at **constant** (base year) prices is **Real GDP**
- Convert from nominal to real GDP using **GDP deflator**:

$$\text{GDP Deflator} = \frac{\text{GDP at current prices}}{\text{GDP at base-year prices}} \times 100$$

$$\textbf{GDP Deflator} = \frac{\textbf{Nominal GDP}}{\textbf{Real GDP}} \times \textbf{100}$$

GDP deflator

- most comprehensive price index

- includes prices of all goods and services produced in the country

- can't use a fixed basket of goods
- g & s produced change each year

5. Below is the data for the **economy** of Hideaway where there are three **final goods and services produced** : Tacos, Tequila, and Hot Tamales.

	Current Output	**Current Period**		**Base Period**	
		Price	**Exp.**	**Price**	**Exp.**
Tacos	100 doz.	$12		$10	
Tequila	60 bottles	$30		$25	
Hot Tamales	50 kg.	$20		$20	

	Current Output		Current Period		Base Period	
			Price	Exp.	Price	Exp.
Tacos	100	doz.	$12	**$1200**	$10	**$1000**
Tequila	60	bottles	$30	**$1800**	$25	**$1500**
Hot Tamales	50	kg.	$20	**$1000**	$20	**$1000**

	Current Output		Current Period		Base Period	
			Price	Exp.	Price	Exp.
Tacos	100	doz.	$12	$1200	$10	$1000
Tequila	60	bottles	$30	$1800	$25	$1500
Hot Tamales	50	kg.	$20	$1000	$20	$1000
Total Expenditures				**$4000**		**$3500**

a) Calculate the total expenditures for this economy at both base and current year prices.

b) What is the value of **Nominal GDP** in the **current period**?

$4000

c) What is the value of **Real GDP** in the **current period**?

$3500

d) What is the **GDP Deflator** in the **current period**?

Nominal / Real X 100 = GDP Deflator

= [**4000** / **3500**] **X 100**

= **114.2857** or, = **114.29**

Conclusion:

- prices of all g & s have risen by 14.3 % since the base year

$$(P_2 - P_1) / P_1 \quad X \quad 100$$

$$= (114.28 - 100) / 100 \quad X \quad 100$$

$$= \ 14.3\%$$

- **CPI** and **GDP Deflator** move together
  - same inflationary forces affect both of them
- **CPI** tracks **consumer prices**
- **GDP deflator** tracks prices of **all** g & s **produced in Canada**

Differences: e.g.,

- world price of coffee rises, pushes up **CPI**
- Canada produces no coffee, so **no effect** on Canadian **GDP deflator**

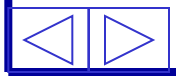
Limitations: Omissions from GDP

GDP does **not** measure economic activity outside of regular and legal markets.

- illegal activities (drugs, prostitution, etc.)
- the underground economy (tax-avoided transactions)
- home production (housework, do-it-yourself projects)
- economic "bads" (pollution)

- are salaries of police a good thing?
- just an offset to the bad (criminals)?

GDP does not measure all aspects of human welfare.



Living Standards: Output and Productivity

Real GDP increased over the past century - two main causes:

1. **An increase in inputs** - land, labour, and capital used in production

2. **An increase** in the amount of **output produced per unit of input**

Per capita output is output per person (GDP/population) – measures the <u>average</u> output or income per person.

Per capita output is a good measure of changes in **average standard of living.**

Income is important part of well-being.

- GDP is a very good measure of income

- changes in GDP good measure of changes in economic well-being

(as long as unmeasured economic activity changes little)

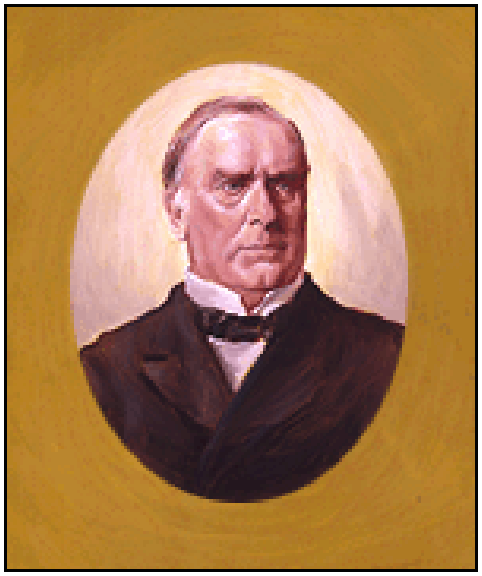
$$\textbf{Labour Productivity} = \frac{\textbf{GDP}}{\textbf{total \# of hours worked}}$$

- Changes in **productivity** better measure of changes in overall **living standards** than changes in **GDP** per capita.

This is only part of overall well-being.

Other factors may contribute to quality of life:

Health, security, environment, etc.



If we will not buy,
we cannot sell.

William McKinley (1899)
President of the U.S.