

C 1 Circular Flow of Income and Spending

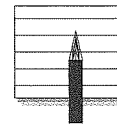
A study of this section will enable you to understand the workings of the economy as a whole and also to understand the effects of government policy. The study should draw on recent changes and developments in the New Zealand economy.

By the end of this chapter you should be able to demonstrate an understanding of economic activity in terms of the circular flow of income and spending. You will be expected to be able to:

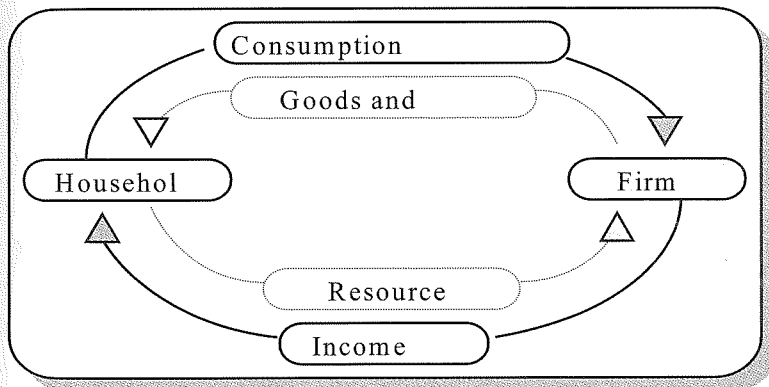
- distinguish between real and nominal values, and explore the nature and range of price indices
- distinguish between nominal and real Gross Domestic Product
- use the income, expenditure, and production approaches to measure Gross Domestic Product
- identify the components of aggregate demand in the New Zealand System of National Accounts

The Circular Flow Diagram

Every year there are billions of individual transactions involving the production and distribution of goods and services, many of which contribute to national income. The **circular flow diagram** is an economic model that provides a useful illustration of how the economy works and it helps us understand how national income is calculated.



Explain what each of the flows in the basic circular flow diagram shows.



The diagram above shows a very simple specialised economy consisting of households and firms. Households own resources, such as their labour, which they may be able to sell to firms in return for an income (Y). They can use this income to buy goods and services, which is **consumption expenditure (C)**. $\uparrow Y \Rightarrow \uparrow C$. Firms buy resources, such as labour, from the households in order to produce goods and services, which they sell to households. We have two sets of physical flows (resources, and goods and services), and two sets of money flows (Y and C). We only consider the money flows. In this **two-sector closed economy**, the equation for total income is: $Y = C$

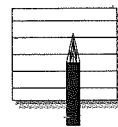
Households can choose to spend their income on consumption expenditure or save it (S) for later. Money can be saved in **financial institutions** (eg. banks) which can lend this money on to others, in particular to producers for investment (I). **Investment** in economics refers to adding to capital resources such as new factories, and machinery. The level of business optimism and the rate of interest (r) influence investment decisions. $\downarrow r \Rightarrow \uparrow I$. So Gross Domestic Product

Define consumption.

Define investment.

Distinguish between the economic and the common usage of the term investment.

(GDP), which is the total income of all households, or the value of all production in the economy, will = $C + S$, or = $C + I$. In this two-sector closed economy, which now includes the role of financial institutions, the equation for total income, or GDP, is $Y = C + I$ (where $I = S$).



Translate the following equations into simple economic statements:

(i) $Y = C + S$

(ii) $Y = C + I$

Calculate the missing values in each of the following equations:

(i) $\underline{\hspace{1cm}} (Y) = 25 (C) + 5 (S)$

(ii) $40 (Y) = 30 (C) + \underline{\hspace{1cm}} (S)$

(iii) $45 (Y) = \underline{\hspace{1cm}} (C) + 8 (S)$

(iv) $\underline{\hspace{1cm}} (Y) = 25 (C) + 10 (I)$

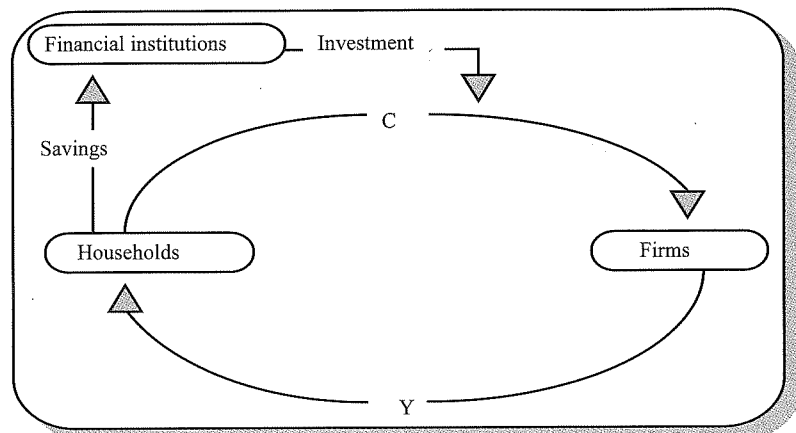
(v) $40 (Y) = 31 (C) + \underline{\hspace{1cm}} (I)$

(vi) If investment was \$7B and national income was \$28B, calculate the level of consumption expenditure.

Explain how government fits into the circular flow diagram.

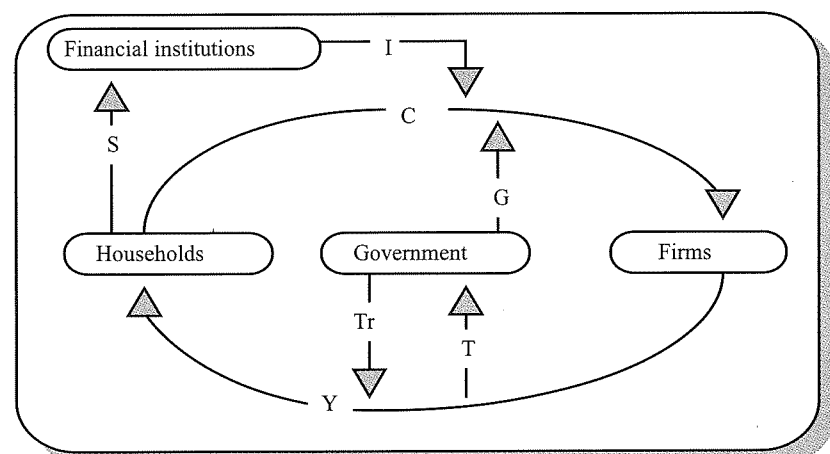
Define the three-sector closed economy.

Define an open economy.



Government is a large sector in the New Zealand economy. **Government spending** is shown by flow (G) and includes spending on roads, schools and hospitals. G is not dependent on the level of income, but will be influenced by political decisions and the election cycle. Most of this money comes from tax revenue (T) paid by households and firms. Government also pays benefits to the sick or unemployed and income support. This flow is known as government **transfer payments** (Tr).

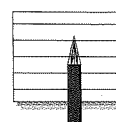
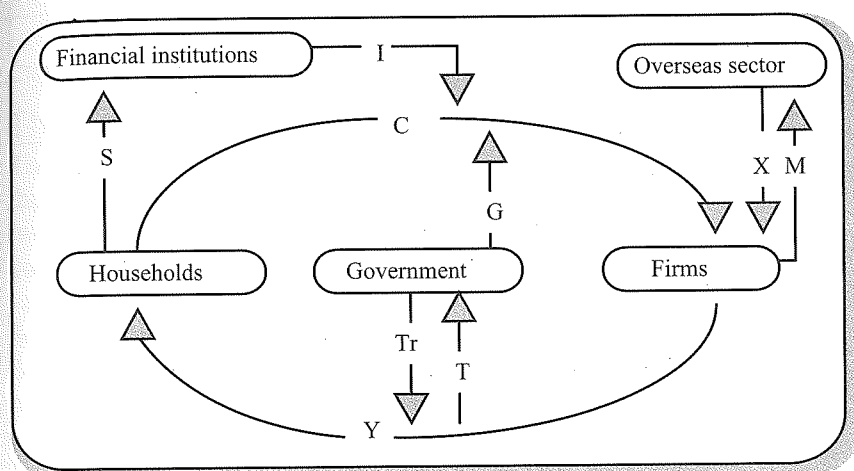
We should now consider Y as disposable income (after taxes have been deducted and transfers added). **NB** we exclude transfers from our calculation of GDP because these are payments that do not relate to production. They are simply transfers of money from some people (usually those with higher incomes) to other people (usually those with lower incomes). These transfers will already be included in the amounts that people spend (C). If we added transfers as well as the amount of consumption expenditure that these benefits led to, then we would be exaggerating GDP. In this **three-sector closed economy**, the equation for total income, or GDP, is: $Y = C + I + G$.



New Zealand has an **open economy** that trades with the rest of the world. (See the graph opposite). The flow (X) refers to export receipts, which is money flowing back to NZ from sales of goods and services to other countries. **NB** the level of X is related to incomes overseas, and not in New Zealand.

The flow (M) refers to import payments made when NZ firms buy goods and services from overseas. Spending on M is dependent on the level of incomes in New Zealand. The circular flow diagram is now complete. GDP is the value of all goods and services produced *in a country*, therefore we must subtract the value of import payments (M). If M was not deducted there would be parts of the consumption, investment and government spending that will have come from imports. It would make income misleading and incorrect. The complete equation for total income, or GDP, is:

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



Match the following items with the appropriate flow shown in the complete circular flow diagram:

- 1 Income tax
- 2 New timber mill built
- 3 Sale of wool to China
- 4 Consumer purchases weekly groceries
- 5 Unemployment benefit
- 6 Paying money into a superannuation scheme
- 7 Purchase of a new Boeing aircraft for Air New Zealand
- 8 Paying for a new public hospital.

Explain the relevance of each of the sectors and flows in the complete circular flow.

The Components of Aggregate Demand

The table below gives each of the symbols, the aggregate each represents, the terminology used in the National Accounts and the approximate values (in \$B) of each flow.

Symbol	Component of aggregate demand	Terminology used in National Accounts	2001 (\$B)
C	Consumption spending	Final consumption expenditure: private	61
I	Investment spending	Gross fixed capital formation	23
G	Government spending	Final consumption expenditure: central government	18
X	Export receipts	Exports of goods and services	34
M	Import payments	Imports of goods and services	33
GDP	Gross domestic product	Expenditure on gross domestic product	103

The New Zealand System of National Accounts

The New Zealand System of National Accounts (NZSNA), is based on the internationally accepted standard (United Nations, 1968) now used by most countries. Amongst the accounts is the calculation of **Gross Domestic Product (GDP)**.

GDP is defined as the total market value of all final goods and services produced in New Zealand in a given year. We should note the following points:

- The *market* value is the final value the consumer pays at the end of the production process. The production of some goods and services does not pass through markets and therefore is not recorded in GDP, eg. the output of homemakers, DIY home improvements etc. In the least-developed economies subsistence farmers, who grow food for their own consumption, will not be reporting their output. GDP will understate their living standards.

Define GDP.

The Incomes Approach

Note that the top half of the table (and, incidentally, the bottom half of the circular flow diagram), relates to the **incomes approach** to calculating GDP. An explanation of the terms used is shown in the formula below. The incomes generated from the production process can be calculated using the following formula:

$$\text{GDP (Incomes approach)} =$$

- Compensation of employees (wages and salaries)
- + Operating surplus (company profits)
- + Consumption of fixed capital (depreciation)
- + Indirect taxes (GST) - Subsidies (assistance to industry)

The Expenditure Approach

The bottom half of the table relates to the **expenditure approach**. Note this is similar to the top half of the circular flow diagram but there are two additional points to note. Firstly, we add in changes in stocks of goods (ΔR) because we are concerned with spending on the current year's output and not on spending on unsold goods from previous years. Secondly, we add in a balancing item called *statistical discrepancy*. Because the information is collected in different ways, this helps us to balance the totals in (a) and (b). To calculate the expenditure on GDP we use the following formula:

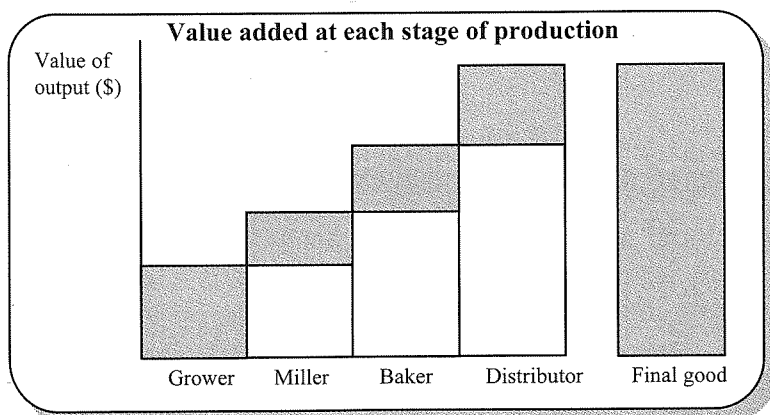
$$\text{Expenditure on GDP} =$$

- Final consumption expenditure by public and private sectors
- + Changes in stocks of goods
- + Gross fixed capital formation
- + Exports
- Imports
- + Statistical discrepancy

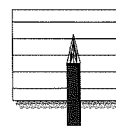
$$\text{or Expenditure on GDP} = C + I + \Delta R + G + (X - M)$$

GDP Using the Production (Value-added) Approach

The contribution of each producer is based on the value added at each stage in the production process. For instance the value added by a bakery is the value of bread and buns etc. produced, minus the value of the goods and services used up in the production process.



Each producer is grouped into production groups based on a standard industry classification. Production groups are then broadly classified as being either those that are normally *marketed* or those that are provided



Which half of the circular flow diagram relates to the following:

(a) Expenditure on GDP?

(b) GDP (incomes approach)?

What is the formula for calculating:

(a) Expenditure on GDP? (use symbols).

(b) GDP incomes approach? (use simple terminology).

Suggest why there is a figure for "statistical discrepancy".

Calculate GDP at market prices using the incomes approach given these figures:

	\$million
Operating surplus	23 000
Increase in stocks	1 300
Compensation of employees	33 000
Export of goods and services	20 000
Consumption of fixed capital	6 400
Net indirect taxes	11 000
Final consumption expenditure by government	12 300
Final consumption expenditure by private sector	46 000
Gross fixed capital formation	14 500

\$ _____ million

For each of the following changes indicate the likely effect on expenditure on GDP:

(a) An increase in income tax.

(b) Stockpiles of wool are building up as NZ producers become less competitive on overseas markets.

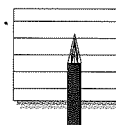
(c) Business confidence and thus investment increases.

in a non-market way. The total for all production groups is termed the *Contribution to GDP by production group*.

Index Numbers

Index numbers will be dealt with now because much of the information economists refer to is in the form of index numbers. Much of the data files on PC Infos are index numbers.

Index numbers are useful in economics, because they help us reduce sometimes complicated statistical changes down to one simple number. An example is the consumers' price index (CPI). To calculate an index number for any data series we divide the current number by the number in a base year and multiply by 1000. See below for the formula for calculating an index.



- (d) Consumers buy more luxury cars.

- (e) Benefits to the sick and elderly are increased.

- (f) Government upgrades highways in the North Island.

Explain how GDP is calculated using the production approach.

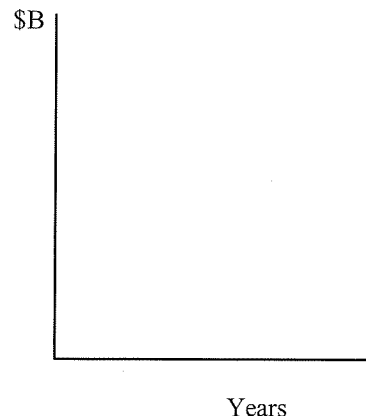
Explain how an index number is calculated.

Define real GDP.

Complete the table below by calculating for the years 1991 - 1997:

- (a) Real GDP
- (b) Index of nominal GDP
- (c) Index of Real GDP.

Draw a multi-line graph to show the Nominal GDP and Real GDP in New Zealand for the years shown.



- (a) Shade the area between the curves.
 - (b) What does the shaded area represent?
-

$$\text{Index} = \frac{\text{Value in current year}}{\text{Value in base year}} \times 1000$$

Real GDP

The purchasing power of national income will be influenced by changes to the general price level (P). The CPI, published quarterly by Statistics NZ, is used. A change in CPI is the standard measure of inflation. We can use CPI as a **price deflator** in calculating the **Real GDP** figure for any inflation (or increase in the price index). To calculate Real GDP where the base year is 1988, we use the following formula:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price index (CPI)}} \times 1000$$

Year	Nominal GDP	CPI	Real GDP	Nominal GDP	Real GDP
	(1000=Dec 1993)			(1000=1990)	(1000=1990)
1990	70773	928	76264	1000	1000
1991	72248	970			
1992	72277	978			
1993	74578	987			
1994	80786	1000			
1995	86577	1040			
1996	91739	1063			
1997	95816	1082			

Changes in GDP

As we can see from the formula, changes in any of the aggregates will result in changes in the expenditure on GDP. For instance, if people saved more, C would decrease and this would have the effect of reducing expenditure on GDP. Note that the other flows are either directed into or out of the main circular flow.

Injections and Withdrawals

The flows that go into the main circular flow are classified as **injections (J)**, and are exogenous to (not affected by) the level of income. They are:

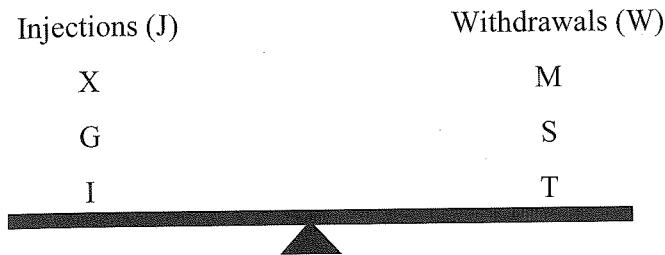
- I investment by both government and the private sector
- G government spending on goods and services
- X export receipts from the sale of exports overseas.

Those flows that leave the main circular flow are called **withdrawals (W)**, and are directly influenced by the level of income.

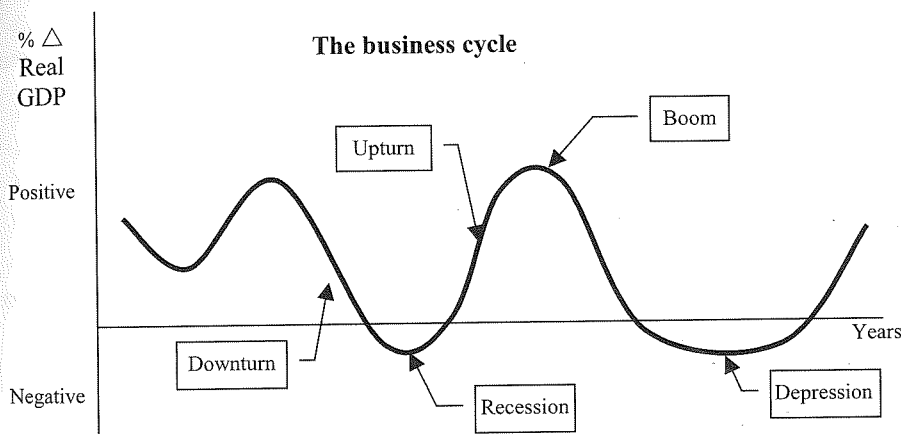
They are:

- S savings by households in the financial sector
- M import payments by NZ firms
- T tax payments to government by both households and firms.

Injections will increase the level of demand in the economy, increase the circular flow and thus GDP. Withdrawals, on the other hand, will reduce the level of demand in the economy, reduce circular flow and thus GDP. If injections balance withdrawals GDP should remain unchanged.



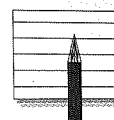
National income remains unchanged as long as $J = W$



Business Cycle

An economic **upturn** will result in more optimism and thus more investment, which will lead to more spending on goods and services and greater employment opportunities. The increase in demand will accelerate the need for more investment as producers try to fill new orders. The effect of this new investment will have a multiplier effect on income which will see the economy approach **boom** times. There will come a point where existing capital stock is sufficient to provide for present demand. This is the upper turning point, and business pessimism sets in.

When new investment slows or stops, fewer people will be employed in the investment industries, which will reduce incomes and spending, and there will be accelerated disinvestment, where firms will not replace capital goods and the economy is on a **downturn**. There will come a point when existing capital stock is insufficient to cope with existing demand. This is the lower turning point and the beginning of the economic **recovery**. New investment will see the start of the next business cycle. A knowledge of the changes in investment is the key to understanding the changes in the business cycle.



Distinguish between an injection into and a withdrawal from the circular flow.

Describe the changes shown in the table opposite.

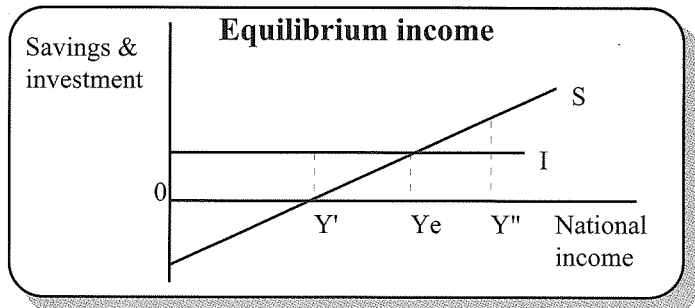
For each of the following situations indicate:

- (a) which flow from the circular flow has been affected and classify it as an injection or a withdrawal
 - (b) the effect on total demand in the economy and GDP.
- (1) Government spends \$100m more on secondary education.
 - (a) _____
 - (b) _____
 - (2) Government reduces company tax, and firms now pay \$37m less to government.
 - (a) _____
 - (b) _____
 - (3) Business investment increases by \$300m.
 - (a) _____
 - (b) _____
 - (4) Households now have to provide for their own retirement and save \$580m more.
 - (a) _____
 - (b) _____
 - (5) Export receipts rise by \$370m.
 - (a) _____
 - (b) _____

Calculate the combined impact on GDP as a result of all the situations (1)-(5).

Equilibrium Level of National Income (Y_e)

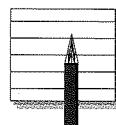
Y_e is where $J = W$. If there is a temporary disequilibrium, income will tend to equilibrium, and this happens without any intervention by government. This can be a problem for government because Y_e is not necessarily desirable (Y_e could be at a level that still results in large scale unemployment, as was the case in the 1930s).



At Y' planned $I >$ planned S . People are spending more than they are saving, leading to a rundown of stocks, an increase in the demand for goods and services, labour and employment. Income level will return to Y_e .

At Y'' planned $S >$ planned I . People are saving more and spending relatively less, leading to a build-up of stocks, a decrease in the demand for goods and services, labour and employment. Income level will return to Y_e .

Establishing equilibrium national income					
Y \$Billion	C \$Billion	I \$Billion	ΔR \$Billion	S \$Billion	ΔY
40	32	20	-12	8	
60	48	20	-8	12	
80	64	20	-4	16	
100	80	20	0	20	
120	96	20	+4	24	
140	112	20	+8	28	



Indicate what will happen to GDP in the following situations:

(a) $W > J$.

(b) $J > W$.

(c) $J = W$.

Identify what will happen to the level of GDP, and the reason why, in the following:

(a) You pay board when you start at your local university.

(b) Grandma moves in with the family when she finds looking after herself in her rented flat too difficult.

(c) Your mother employs a cleaner now that she has found herself a job.

(d) You start to get paid a sum for each of the chores you do round the house.

(e) \$1000m is spent cleaning up a massive oil spill on the coast.

(f) A huge forest fire destroys a luxury suburb in the capital.

Complete the table by indicating the change in income (ΔY).

Write a short passage to describe what the table shows.
