

The background is an abstract composition of various colored squares and rectangles, some of which are outlined with thin black lines, creating a grid-like effect. The colors include shades of blue, green, yellow, orange, and purple. The overall texture is painterly, with visible brushstrokes and a slightly mottled appearance. A small registered trademark symbol (®) is visible in the top right corner.

National Income: Where It Comes From and Where It Goes

Gross Domestic Product

Gross Domestic Product is a measure of how well the economy is performing. The Central Statistical Organization (part of the GoI's Dept. of MOSPI) calculates GDP via **administrative data**, which are byproducts of government functions such as tax collection, education programs, defense, and regulation, and statistical data, which come from government surveys of, for example, NSSO, ASI, retail establishments manufacturing firms and farm activity.

- **GROSS DOMESTIC PRODUCT (GDP)**

It is the value of all final goods and services produced for the marketplace during a given time period within a country's borders.

- The GDP in India is calculated using two different methods
- 1st method is based on economic activity (at factor cost), and the 2nd is based on expenditure (at market prices)
- Following 8 industry sectors are considered in the 1st method:
 - Agriculture, forestry and fishing;
 - Mining and quarrying;
 - Manufacturing;
 - Electricity, gas and water supply;
 - Construction;
 - Trade, hotels, transport and communication;
 - Financing, insurance, real estate and business services;
 - Community, social and personal services.

(Rupees Billion)										
Year	Quarter	Agriculture & allied	Mining & Quarrying	Manufacturing	Electricity, Gas & Water Supply	Construction	Trade, hotels, transport & communication	Finance, Insurance, Real Estate & Business Services	Community, Social & Personal Services	GDP (fc)
2007-08	Q1	1279.60	142.83	1131.11	159.18	539.99	1981.68	1093.40	932.07	7259.86
	Q2	1024.96	138.10	1154.99	157.88	548.56	2026.22	1116.34	1015.04	7182.10
	Q3	1827.38	159.46	1203.50	159.06	576.88	2252.30	1154.84	983.95	8317.37
	Q4	1439.26	179.60	1273.43	161.18	597.82	2493.81	1211.26	1181.49	8537.85
2008-09	Q1	1318.49	149.41	1193.32	163.55	585.54	2238.62	1169.02	1008.24	7826.20
	Q2	1052.14	143.21	1213.61	163.84	601.01	2271.28	1187.39	1106.02	7738.50
	Q3	1811.97	167.33	1214.35	164.64	600.90	2384.67	1250.67	1205.26	8799.80
	Q4	1477.83	182.50	1256.11	166.95	638.30	2651.34	1326.48	1329.73	9029.24
2009-10	Q1	1349.68	161.19	1234.48	173.67	627.13	2419.61	1263.22	1076.60	8305.57
	Q2	1061.16	156.88	1324.92	176.04	639.83	2464.52	1278.44	1246.02	8347.80

Rules for Computing GDP

1) To compute the total value of different goods and services, the national income accounts use market prices.

Thus, if:



$$\begin{aligned}\text{GDP} &= (\text{Price of apples} \times \text{Quantity of apples}) \\ &\quad + (\text{Price of oranges} \times \text{Quantity of oranges}) \\ &= (\$0.50 \times 4) + (\$1.00 \times 3) \\ \text{GDP} &= \$5.00\end{aligned}$$

2) Used goods are **not** included in the calculation of GDP.

3) The treatment of inventories depends on if the goods are stored or if they spoil. If the goods are stored, their value is included in GDP. If they spoil, GDP remains unchanged. When the goods are finally sold out of inventory, they are not counted.

More Rules for Computing GDP

4) Intermediate goods are not counted in GDP— only the value of final goods. Reason: the value of intermediate goods is already included in the market price.

Value added of a firm = the value of the firm's output - the value of the intermediate goods the firm purchases.

5) Some goods are not sold in the marketplace and therefore don't have market prices. We must use their *imputed value* as an estimate of their value. For example, home ownership and government services.

Real Vs. Nominal GDP

The *value of final goods and services measured at current prices* is called *nominal GDP*.

$$\text{Nominal GDP } Y = P \times y$$

This distinction between real and nominal can also be applied to other monetary values, like wages.

This conversion from nominal to real units allows us to eliminate the problems created by having a measuring stick (dollar value) that essentially changes length over time, as the price level changes.

How real GDP is computed in our **apple** & **orange** economy?

If we want to compare output in **2009** and output in **2010**, we would need *base-year prices*, i.e. **2009** prices.

Real GDP in 2009 would be:

$(\text{2009 Price of Apples} \times \text{2009 Quantity of Apples}) +$
 $(\text{2009 Price of Oranges} \times \text{2009 Quantity of Oranges}).$

Real GDP in 2010 would be:

$(\text{2009 Price of Apples} \times \text{2010 Quantity of Apples}) +$
 $(\text{2009 Price of Oranges} \times \text{2010 Quantity of Oranges}).$

Real GDP in 2011 would be:

$(\text{2009 Price of Apples} \times \text{2011 Quantity of Apples}) +$
 $(\text{2009 Price of Oranges} \times \text{2011 Quantity of Oranges}).$

Note that **2009** prices are used to compute real GDP for all three years. Because prices are held constant from year to year, real GDP varies only when the quantities produced vary.

GDP Deflator

THE IMPLICIT PRICE DEFLATOR FOR GDP

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

Nominal GDP measures the current dollar value of the output of the economy.

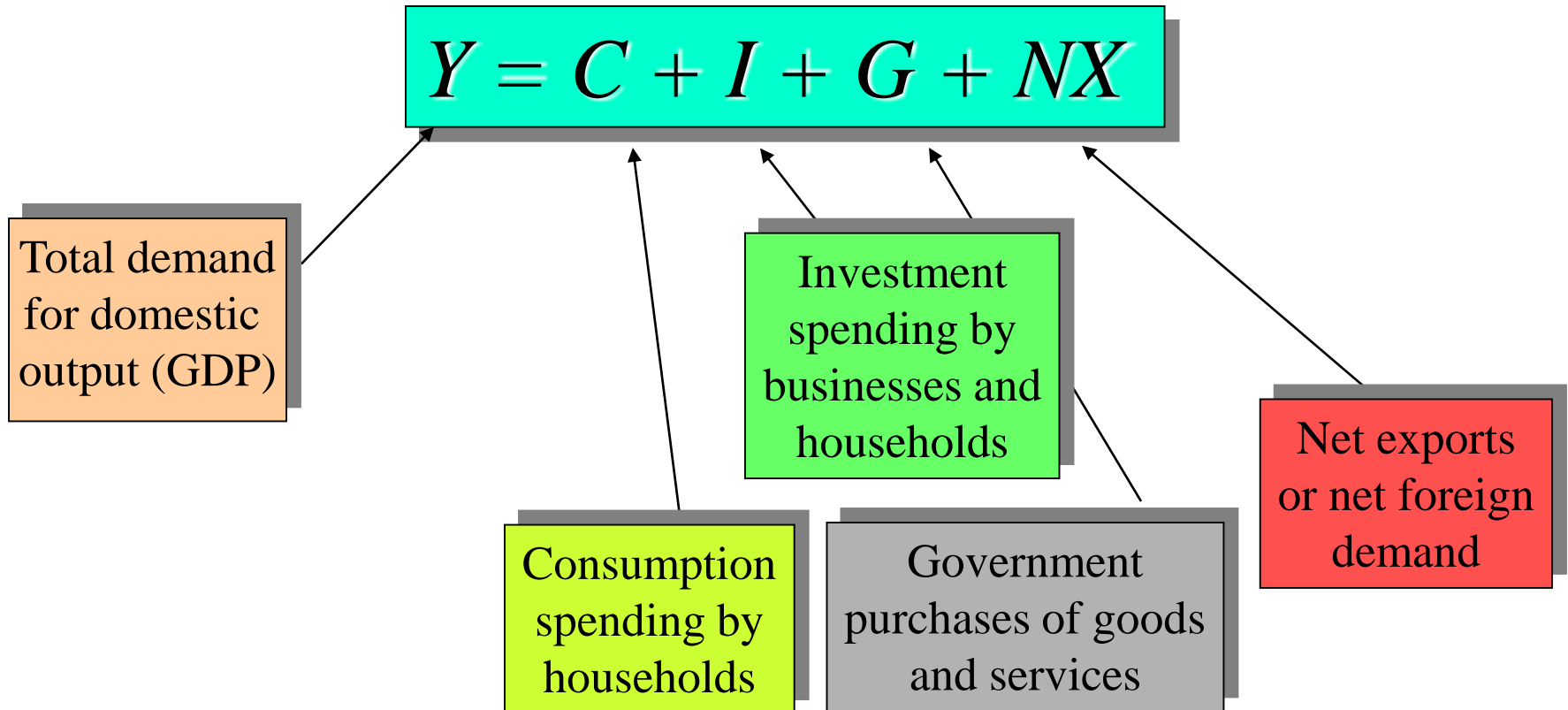
Real GDP measures output valued at constant prices.

The *GDP deflator*, also called the *implicit price deflator for GDP*, measures the price of output relative to its price in the base year. It reflects what's happening to the overall level of prices in the economy.

Assume a U.S. dealer bought 100 TVs from South Korea for \$250 each in 2006. He subsequently sold 80 of them in 2006 for \$450 each, and the rest in 2007 for \$400 each. By how much was the U.S. GDP affected in 2006?

- a. \$45,000
- b. \$36,000
- c. \$19,000
- d. \$16,000
- e. \$11,000

Components of Expenditure



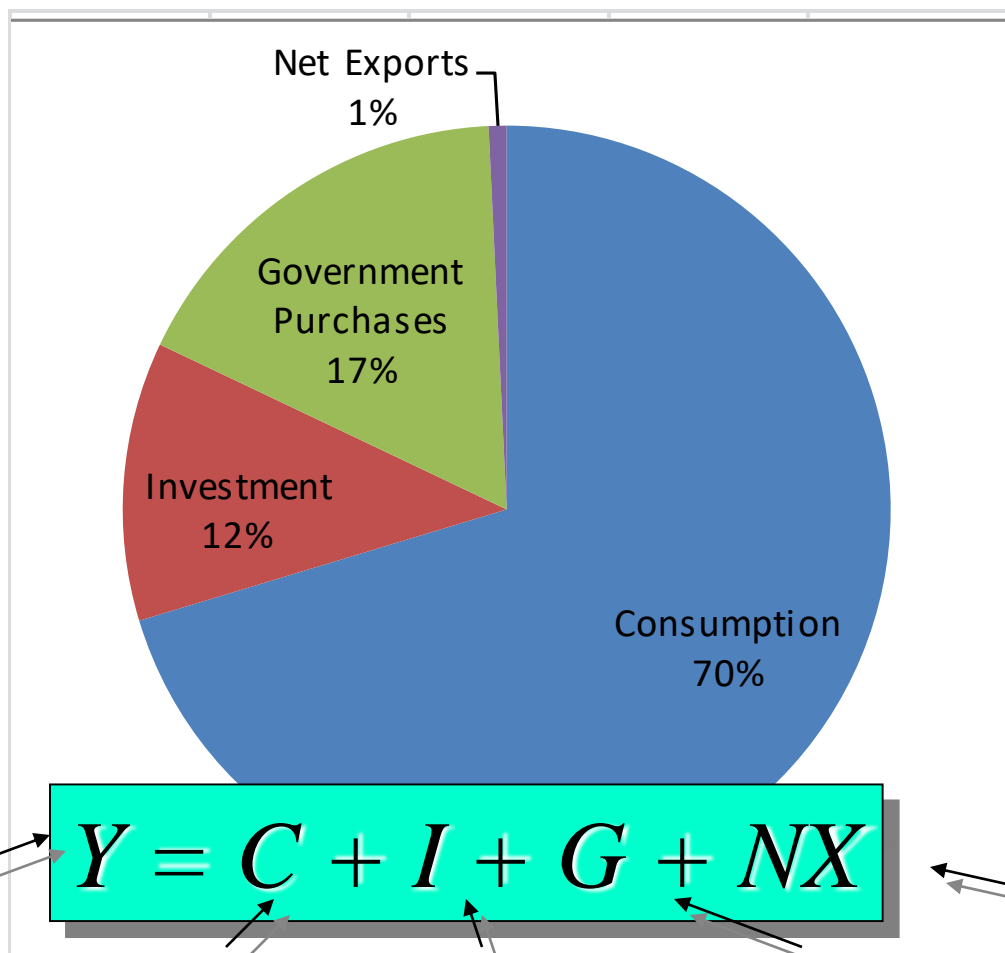
This is called the *national income accounts identity*.

GDP and Its Components

Let in 2017, Indian GDP totaled about 13.8 trillion. This number is incomprehensible. So, if we divide this number by the total population of say 302 million, we get GDP per person—the amount of expenditure for the average Indian – which equaled **Rs. 45,707** in 2017.

Let's break it down visually on the next slide.

GDP (Y) was Rs.45,707 per person



$$Y = C + I + G + NX$$

$$\$45,707 = \$31,995 + \$5,485 + \$7,770 + \$457$$

- We begin with firms and see what determines their level of production (therefore, the level of national income).
- Next, we consider how much of this income households consume and how much they save. We will also discuss the demand arising from investment and government purchases. Finally, we discuss how the demand and supply for goods and services are brought into balance.

Quick Recap....

In national Income Accounts what is the difference between?

1. A firm's buying an auto for an executive and the firm paying the executive additional income to buy the car by herself.
2. Your hiring your spouse rather than having him/ her do the work without pay.
3. You decided to study M.Tech from Stanford University as against IIT, B.

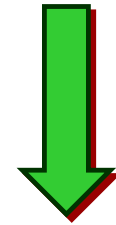
- The expenditure (at market prices) method involves summing the domestic expenditure on final goods and services across various streams during a particular time period.
- It includes consideration of expenses towards household consumption, investments, government costs, and net trade (exports minus imports).

What determines the Total Production of Goods and Services?

An economy's output of goods and services (GDP) depends on:

(1) quantity of inputs ➡ **The Factors of Production**

(2) ability to turn inputs into output ➡ **The Production Function**



technology

The Factors of Production

- The *factors of production* are the inputs used to produce goods and services. The two most important factors of production are capital and labor. In this module, we will take these factors as given

K (capital) = K

L (labor) = L

The Production Function

The available production technology determines how much output is produced from given amounts of capital (K) and labor (L)..

We write the production function as:

$$Y = F (K , L)$$

How is NI distributed among Factors of Production?

The total output of an economy equals total income.

Because the factors of production and the production function together determine the total output of goods and services, they also determine national income.

FACTOR PRICES

Factor prices are the amounts paid to the factors of production—the *wages* workers earn and the *rent* the owners of capital collect.

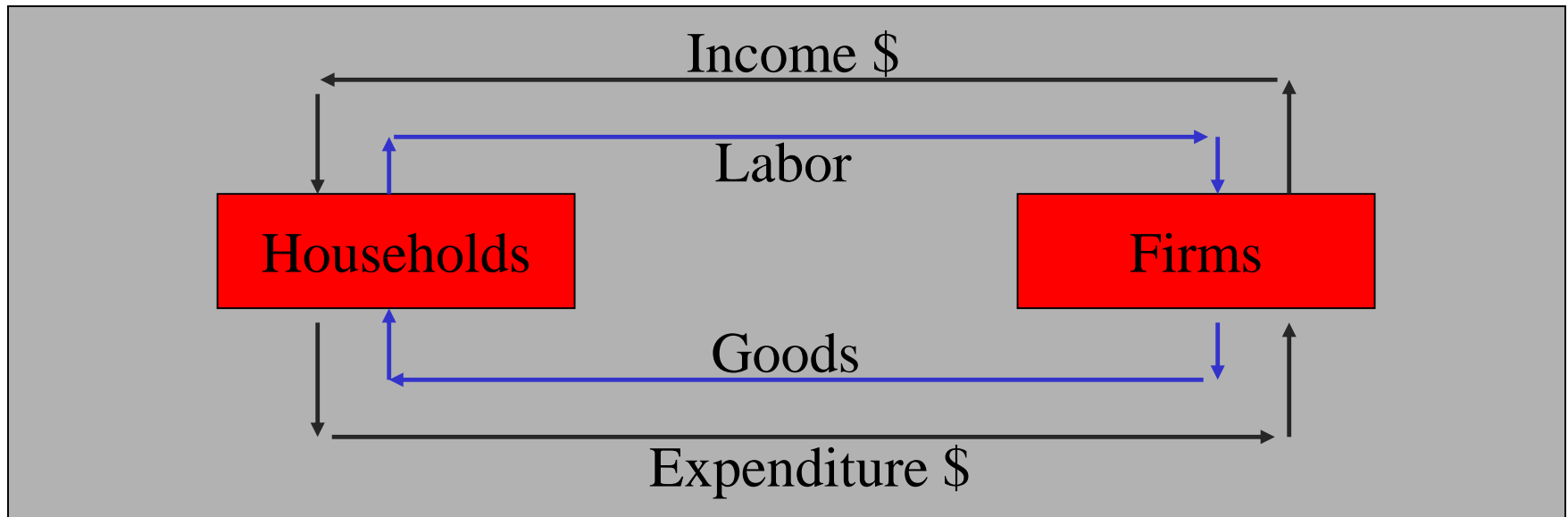
The price paid to any factor of production typically depends on the supply and demand for that factor's services.

So, demand for workers determine wages, demand for land determine rent, etc..

Income, Expenditure, and the Circular Flow

Two ways
of viewing GDP

- Total **income** of everyone in the economy
- Total **expenditure** on the economy's output of goods and services



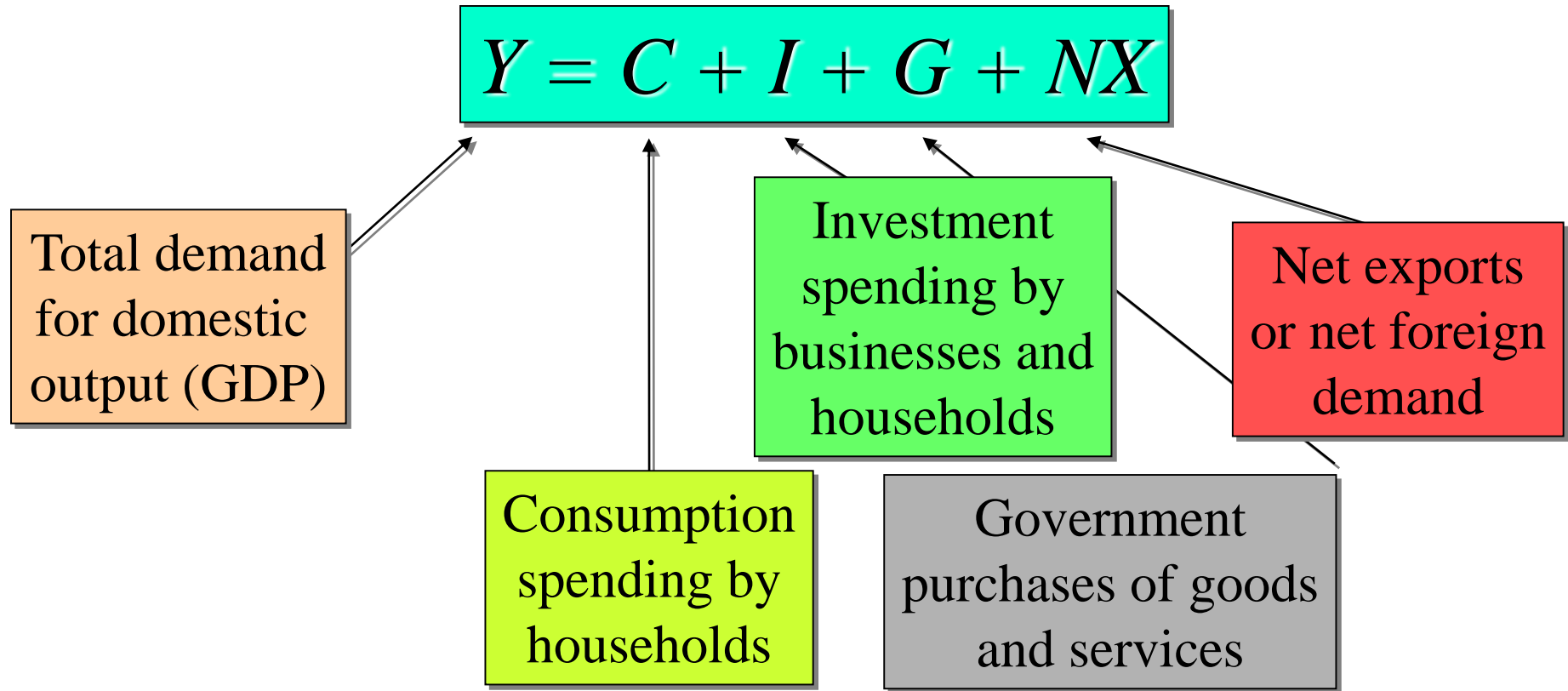
For the economy as a whole, *income must equal expenditure*.
GDP measures the *flow* of dollars in the economy.

The goal of the firm is to maximize profit. *Profit* is revenue minus cost.

- Revenue equals $P \times Y$.
- Costs include both labor and capital costs.
- Labor costs = $W \times L$, the wage multiplied by the amount of labor L .
- Capital costs = $R \times K$, the rental price of capital R times the amount of capital K .

$$\begin{aligned}\text{Profit} &= \text{Revenue} - \text{Labor Costs} - \text{Capital Costs} \\ &= P.Y \quad - \quad W.L \quad - \quad R.K\end{aligned}$$

What determines the demand and supply of goods and services?



We are going to assume our economy is a closed economy, therefore it eliminates the last-term net exports, NX . So, the three components of GDP are Consumption (C), Investment (I) and Government purchases (G). Let's see how GDP is allocated among these three uses.

- $C = C_d + C_f$
- $I = I_d + I_f$
- $G = G_d + G_f$
- $Y = C + I + G + X - (C_f + I_f + G_f)$
or, $Y = C + I + G + (X - IM)$

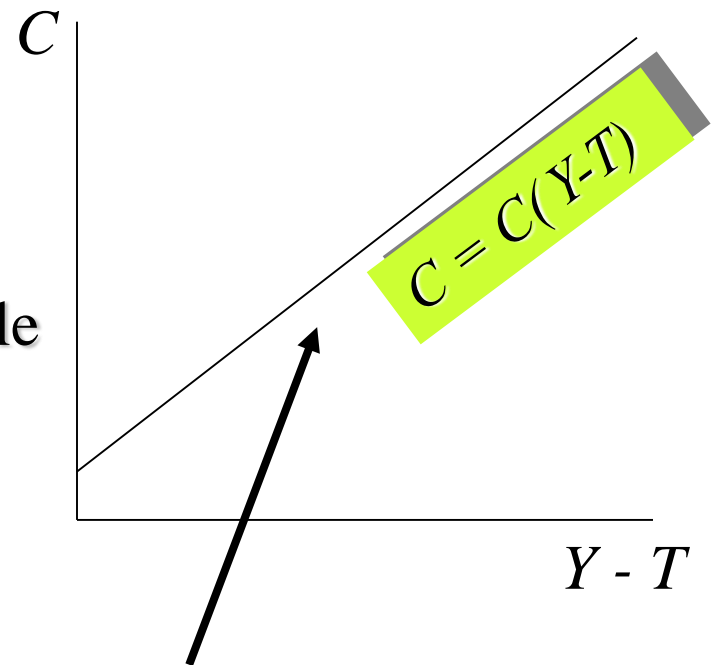
The Consumption Function

$$C = C(Y - T)$$

consumption
spending by
households

depends
on

disposable
income



The slope of the consumption function
is the MPC .

The Marginal Propensity to Consume

The *marginal propensity to consume* (MPC) is the amount by which consumption changes when disposable income ($Y - T$) increases by one dollar.

To understand the MPC , consider a shopping scenario. A person who loves to shop probably has a large MPC , let's say (\$.99). This means that for every *extra* dollar he or she earns after tax deductions, he or she spends \$.99 of it.

Multipliers.....

- **The government-purchases multiplier:**

$$\Delta Y / \Delta G = 1 + MPC + MPC^2 + MPC^3 + \dots$$

$$\Delta Y / \Delta G = 1 / 1 - MPC$$

Economics focus

Much ado about multipliers

Why do economists disagree so much on whether fiscal stimulus works?

Sep 24th 2009

 Timekeeper

 Tweet

IT IS the biggest peacetime fiscal expansion in history. Across the globe countries have countered the recession by cutting taxes and by boosting government spending. The G20 group of economies, whose leaders meet this week in Pittsburgh, have introduced stimulus packages worth an average of 2% of GDP this year and 1.6% of GDP in 2010. Co-ordinated action on this scale might suggest a consensus about the effects of fiscal stimulus. But economists are in fact deeply divided about how well, or indeed whether, such stimulus works.

Illustration by Jac Depczyk



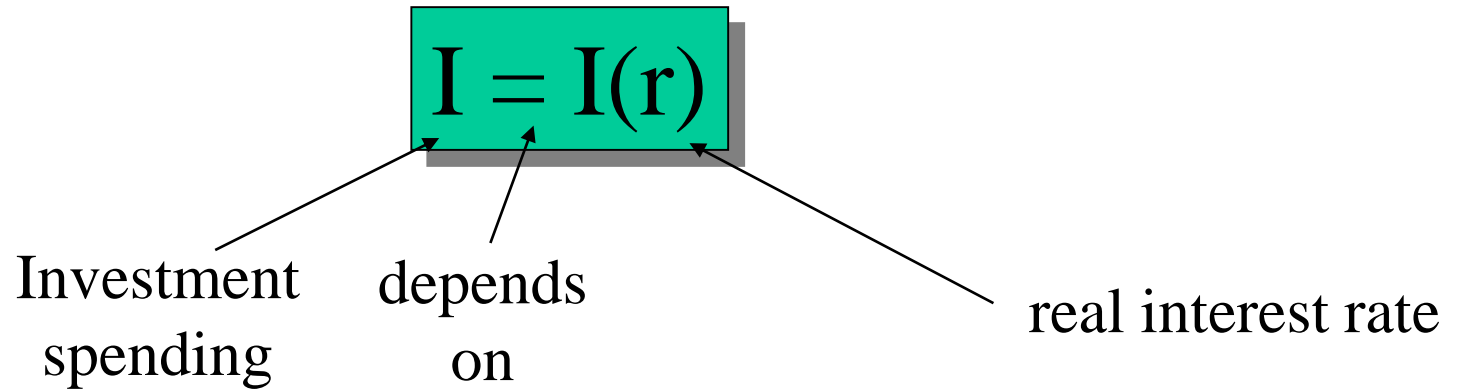
The debate hinges on the scale of the "fiscal multiplier". This measure, first formalised in 1931 by Richard Kahn, a student of John Maynard Keynes, captures how effectively tax cuts or increases in government spending stimulate output. A multiplier of one means that a \$1 billion increase in government spending will increase a country's GDP by \$1 billion.

The size of the multiplier is bound to vary according to economic conditions. For an economy operating at full capacity, the fiscal multiplier should be zero. Since there are no spare resources, any increase in government demand would just replace spending elsewhere. But in a recession, when workers and factories lie idle, a fiscal boost can increase overall demand. And if the initial stimulus



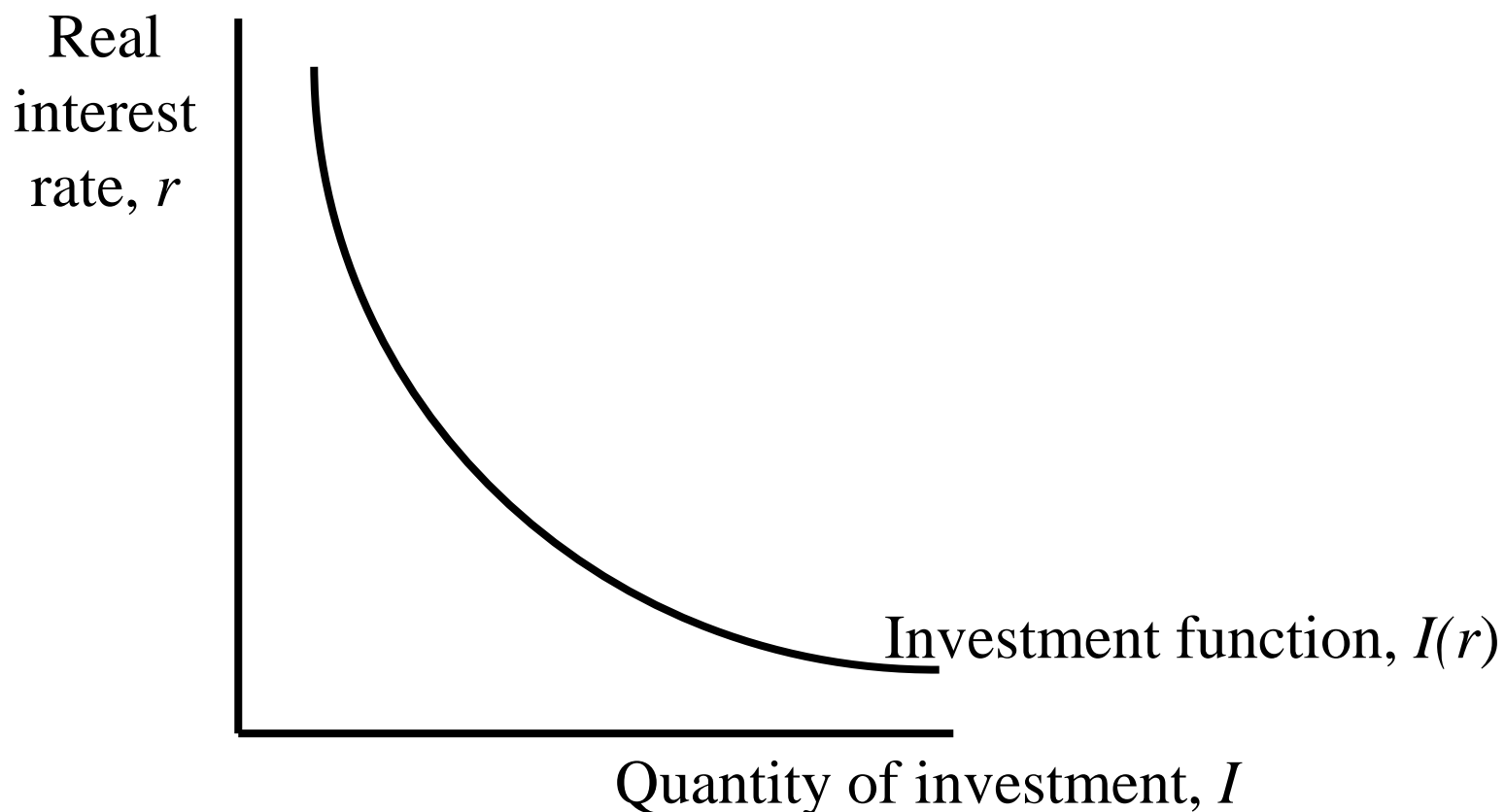
Economics briefs
Six big ideas

The Investment Function



The quantity of investment depends on the real interest rate, which measures the cost of the funds used to finance investment.

Investment depends on the real interest rate r because it is the cost of borrowing. The investment function slopes downward; when the interest rate rises, fewer investment projects are profitable.



Government Purchases

We take the level of government spending and taxes as given.

$$G = \overline{G}$$

- If government purchases equal (taxes minus transfers), then $G = T$, and the government has a *balanced budget*.

$$T = \overline{T}$$

- If $G > T$, then the government is running a *budget deficit*.

- If $G < T$, then the government is running a *budget surplus*.

What Brings the Supply and Demand for Goods and Services Into Equilibrium?

The following equations summarize the discussion of the demand for goods and services:

- | | |
|--------------------|-----------------------------|
| 1) $Y = C + I + G$ | Demand for Economy's Output |
| 2) $C = C(Y - T)$ | Consumption Function |
| 3) $I = I(r)$ | Real Investment Function |
| 4) $G = \bar{G}$ | Government Purchases |
| 5) $T = \bar{T}$ | Taxes |

To this analysis, let's add what we've learned about the supply of goods and services earlier in the module. There we saw that the factors of production and the production function determine the quantity of output supplied to the economy:

$$Y = F(\bar{K}, \bar{L}) \\ = \bar{Y}$$

Now, let's equate to this the demand for the output. So we obtain:

$$\bar{Y} = C(Y - T) + I(r) + G$$



This equation states that the supply of output equals its demand, which is the sum of consumption, investment, and government purchases.

Changes in Saving: The Effects of Fiscal Policy

An Increase in Government Purchases: If we increase government purchases by an amount dG , Demand will 

As disposable ($Y-T$) is unchanged, C is unchanged.

The rise in government purchases must be met by  in I .

To induce I to fall, the interest rate must rise. Hence, the rise in government purchases causes the r to  and I to 

Thus, government purchases are said to ***crowd out*** investment.

A Decrease in Taxes:

The immediate impact of a tax cut is to raise disposable income and thus to raise consumption.

Disposable income rises by dT , and consumption rises by an amount equal to dT times the MPC .

The higher the MPC , the greater the impact of the tax cut on consumption.

As the govt's revenue falls, it has to borrow money, hence r increases. This reduces I .

So, government purchases, tax cuts ***crowd out*** investment.

Gross Domestic Product

- **How Investment Is Financed?**
 - Investment is financed from three sources:
 - Private saving, S
 - Government budget surplus, $(T - G)$
 - Borrowing from the rest of the world $(M - X)$

Gross Domestic Product

- The three sources of investment finance comes from the fact that aggregate expenditure equals aggregate income.
- Start with

$$Y \equiv C + S + T = C + I + G$$

Then rearrange to obtain

$$I = S + (T - G)$$

Private saving S plus government saving $(T - G)$ is called **national saving**.

- Limitations of GDP ?