

# MODULE 1

## The Dimensions of Economic Activity

This lesson begins with a discussion of what is meant by ‘the economy’ and then introduces the notions of capital and income and explains the relationship between stocks and flows. It then develops the ideas of output and income and depreciation together with the concepts of gross and net investment. Gross National Product and Net National Product are defined. The role of savings in determining the growth of capital stock and income is then explained and other necessary conditions for economic growth to occur are noted. Next the reasons why people hold money are explored along with the distinction between real and nominal magnitudes. Examples of real and nominal GNP, money holdings and wages are plotted. The lesson ends with a discussion of what is meant by the term inflation.

## 1. The Nature of Economic Activity: Stocks and Flows

The economy can be described as a collection of resources together with the set of institutions that govern their use. These resources are the economy's stock of capital, broadly defined to include human skills, knowledge and technology as well as land, buildings, machinery, etc. Institutions are the rules and procedures by which people, organizations and government interact in conducting their affairs. Within the constraints imposed by institutions, the stock of capital produces the flow of goods and services that the public enjoys. It is important to clearly understand the distinctions between stocks and flows in order to understand the relationship between capital and output. Stocks are quantities existing at a point in time and have no time dimension while flows represent rates of yield or change per unit time.

## 2. Output, Income and Depreciation

The capital stock in the economy generates or produces the flow of output of goods and services enjoyed by its residents. With the passage of time, physical capital tends to wear out, human capital dies with the individuals in which it is embodied and the stocks of non-renewable resources (coal, oil, etc.) become depleted. Unless a portion of the output flow from the economy's capital stock is set aside to replenish the capital stock in the face of this depreciation, the capital stock and the output flow produced by it will decline through time. Income is the amount of the output flow remaining after provision has been made to maintain the capital stock intact. It is the maximum amount that could be consumed without drawing down the capital stock. When depreciation is a constant proportion of the capital stock through time, income is the maximum constant amount that could be consumed every year in perpetuity.

This relationship is described by the following equation:

$$Y = X - D \tag{1}$$

where  $Y$  is the level of income,  $X$  is the level of output and  $D$  is depreciation (and depletion).

*Gross National Product (GNP)* is defined as the aggregate value of the output from domestically owned capital. *Net National Product (NNP)* is

the aggregate income from that domestic capital. The difference between these gross and net aggregates is depreciation.

### 3. Consumption, Capital Accumulation and Growth

Investment is an addition to the capital stock. The addition necessary to offset depreciation is called *replacement investment*. Additions in excess of that are called *net investment*. The sum of these components is *gross investment*. As in the case of national income and product, the difference between gross and net is depreciation.

Income can be disposed of in two ways—it can be consumed or added to the capital stock. Thus

$$Y = C + I \tag{1}$$

where  $Y$  is income,  $C$  is consumption, and  $I$  is net investment. If consumption is less than income, the capital stock will grow and income will increase through time. If consumption is greater than income, the capital stock and income will decline through time.

Since

$$I_G = I + D \tag{2}$$

where  $I_G$  is gross investment and  $D$  is depreciation, it follows that

$$X = Y + D = C + I + D = C + I_G \tag{3}$$

Finally we note that the growth of knowledge and technology, referred to as technological change, is part of the economy's net investment—resources that could otherwise be used for consumption have to be used to produce new ideas and productive applications of them.

Growth of income per capita depends both on the growth of the capital stock and income and the growth of population. For output growth to be sustained in the presence of continuous capital accumulation, the various forms of capital including knowledge and technology must grow in the appropriate proportions. If knowledge and technology do not grow fast enough relative to other forms of capital—human skills, machinery, inventories, etc.—diminishing returns to the more rapidly expanding inputs will be encountered. That is, the increments to output resulting from successive increments to the capital stock will get smaller and smaller.

## 4. The Nature and Functions of Money

Money holdings, defined as cash in pocket plus deposits in commercial banks, are another component of the economy's capital stock.

People hold money because it saves labor and capital resources that would otherwise have to be used in making transactions. Barter is inefficient because it requires a double coincidence of wants—each party to a transaction must want to sell exactly what the other party wants to buy. The use of credit instead of cash is inefficient for small transactions because establishing the credit worthiness of other transactors is costly.

The quantity of money can be defined narrowly to include only cash in pocket and chequable deposits or more broadly to include time deposits and perhaps other liquid assets as well. Assets are said to be more liquid than other assets if they can be converted more cheaply into an amount of cash known in advance. Government bonds are quite liquid because they can be sold almost immediately at a price falling within a narrow range. One's house is extremely illiquid because it may take several weeks to sell it for the best possible price and it one can only make a guess before hand what that price will be.

## 5. Real vs. Nominal Magnitudes

Money provides a unit of account in which to measure economic magnitudes. Over time the prices of goods in terms of money have tended to rise and the amount of goods a unit of money will buy has tended to fall. Money measures therefore do not always provide a good indication of what is really happening in the economy. Measures of real magnitudes are necessary.

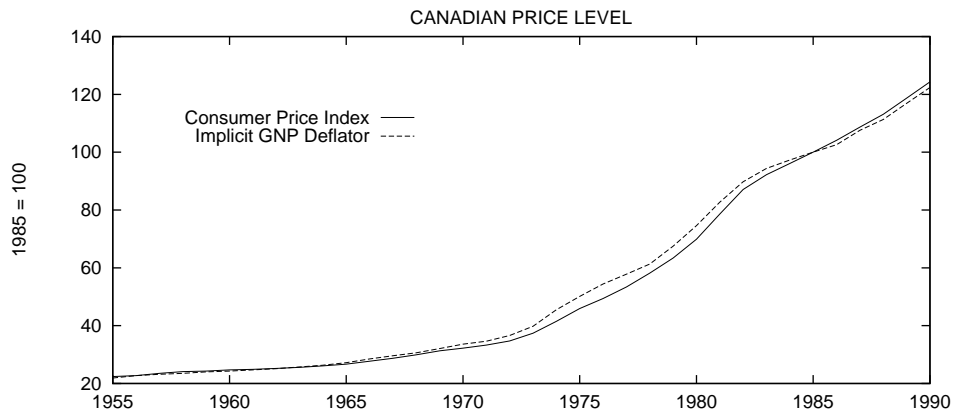
The *price level* in a particular year is defined as the average price of a bundle of goods in that year relative to the price that same bundle of goods sold for in some base period. Nominal magnitudes are measured in current prices. Real magnitudes are measured in the prices of some base period. The level of real GNP is thus the current output from domestically owned human, physical and other forms of capital measured in the dollars of some base year. Movements of real GNP measure changes in real output, while movements of nominal GNP measure changes in the money value of output. The ratio of nominal GNP to real GNP is thus a measure of the price level. It is called the *GNP deflator*. Another measure of the price level is the *consumer price index (CPI)*, the ratio of the current price of the bundle of goods the average person consumes to the price of that same bundle of

goods in some base year.

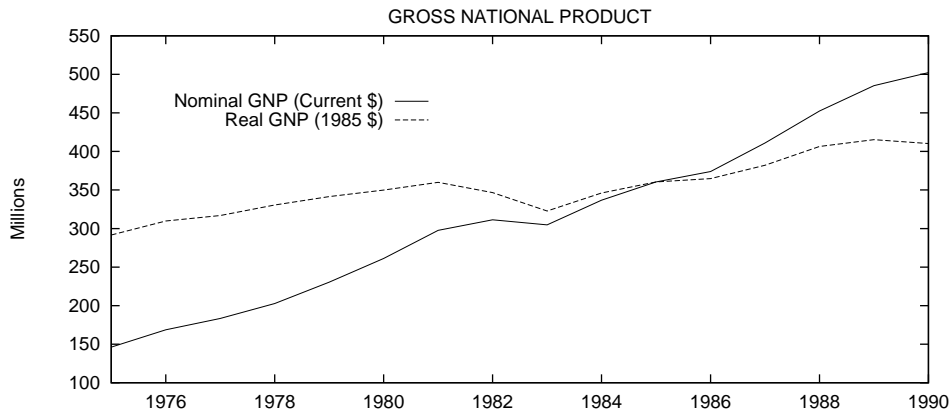
Nominal magnitudes are converted into real magnitudes by deflating them by a measure of the price level. Real GNP, real wages and real money holdings are, respectively, nominal GNP, money wages and the money supply divided by the price level and then adjusted to equal 100 in some base period. Real magnitudes are important because we would expect people to base their decisions about what to consume, how much to work and how much money to hold on real rather than nominal magnitudes. In other words, people are more concerned about the amount of goods they can expect to consume now and in the future than on the nominal value of their money holdings and other assets.

Figures 5.1 through 5.4 plot, respectively, the CPI and GNP deflator, nominal and real GNP, real and nominal hourly wage rates in manufacturing and real and nominal money holdings, all for Canada. The real money stock is on the base 1955 = 100 and the remaining real series are on a 1985 base. These charts indicate clearly the substantial rise in the Canadian price level since the 1950s.

**FIGURE 5.1:**



**FIGURE 5.2:**



**FIGURE 5.3:**

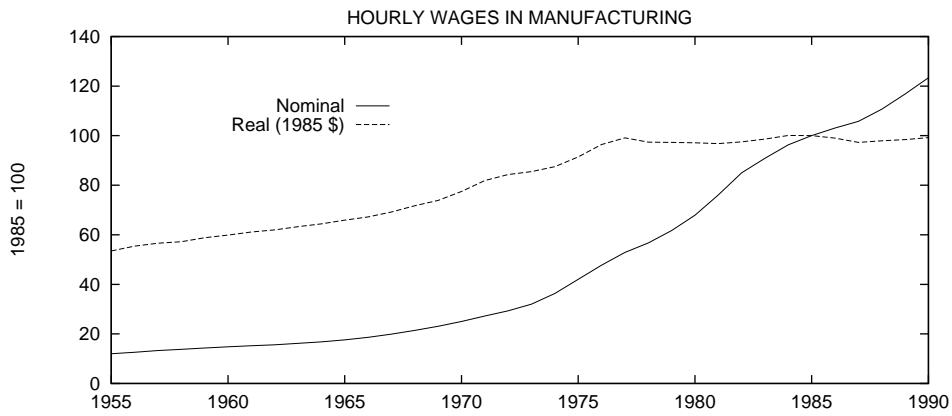
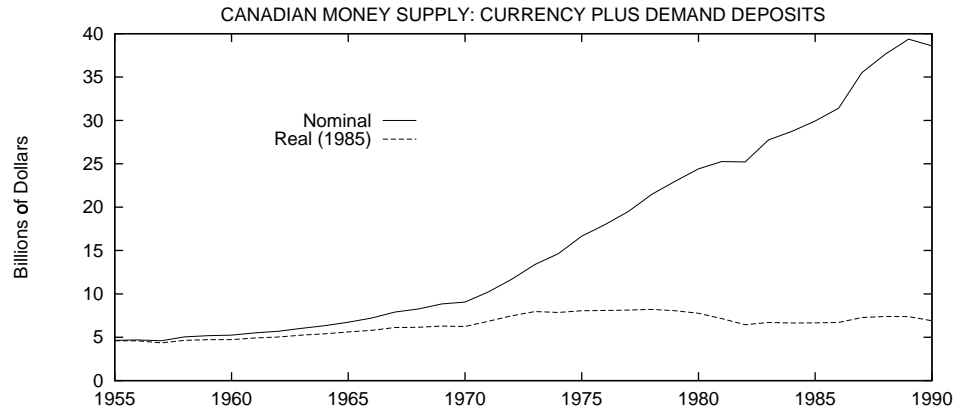


FIGURE 5.4:



## 6. Inflation

Inflation refers to an increase in the price level. There are two senses in which the term is used—to refer to an increase in the level of prices over a period of years, and to refer to an ongoing year over year increase in the price level. The percentage year over year increase in the price level is called the inflation rate. It can be expressed

$$\theta_p = 100 (P_t - P_{t-1}) / P_{t-1} \quad (1)$$

where  $\theta_P$  is the inflation rate and  $P$  is an index of the general price level.

Figure 6.1 plots the Canadian price level and Figure 6.2 the Canadian inflation rate using the CPI and GNP deflators as alternative measures of the price level. Figure 6.3 compares the CPI inflation rates of Canada and the United States. Figure 6.4 adds the U.K. inflation rate to Figure 6.3. The German, Italian and U.S. inflation rates are plotted in Figure 6.5. While average rates of inflation differ across countries, the general patterns are the same. All these countries experienced increased inflation after 1965, with a peak in the early 1970s followed by a dip in the mid 1970s and another peak at the end of the decade. Inflation rates then fell in all countries in the 1980s. The implications of the differences in countries' inflation rates with respect to their price levels is shown in figures 6.6 and 6.7.

FIGURE 6.1:

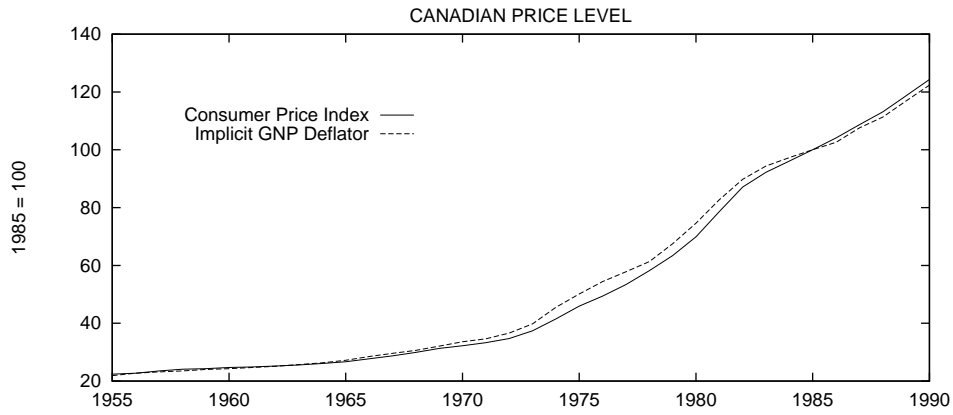
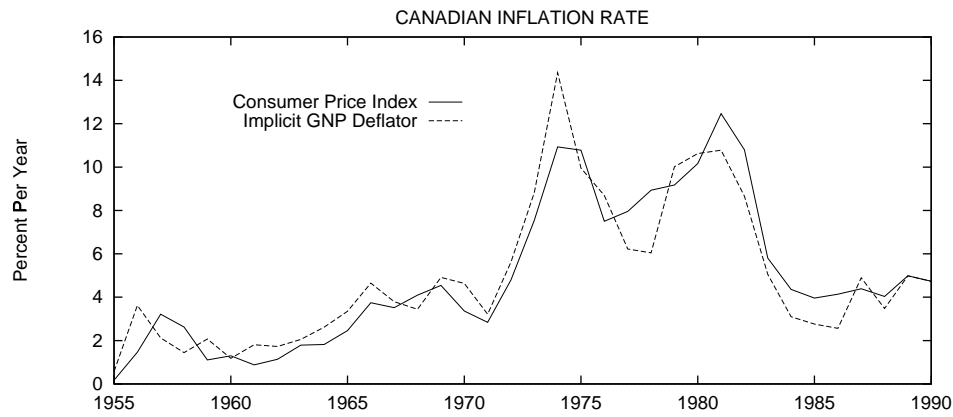
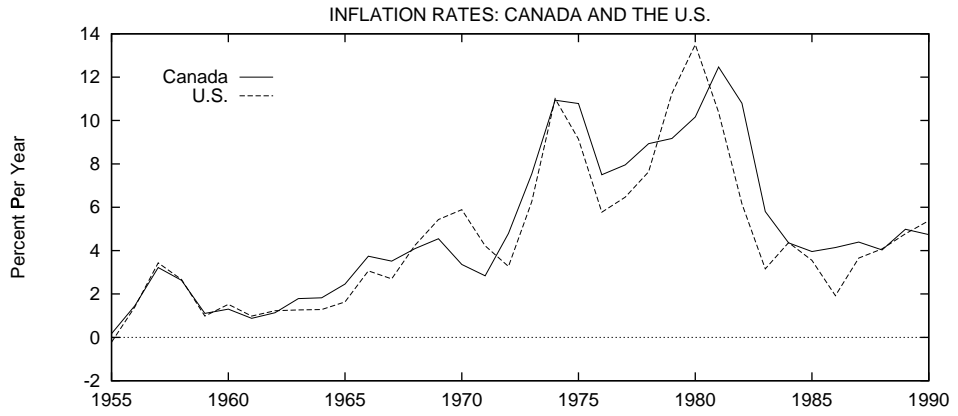


FIGURE 6.2:





**FIGURE 6.3:**



**FIGURE 6.4:**

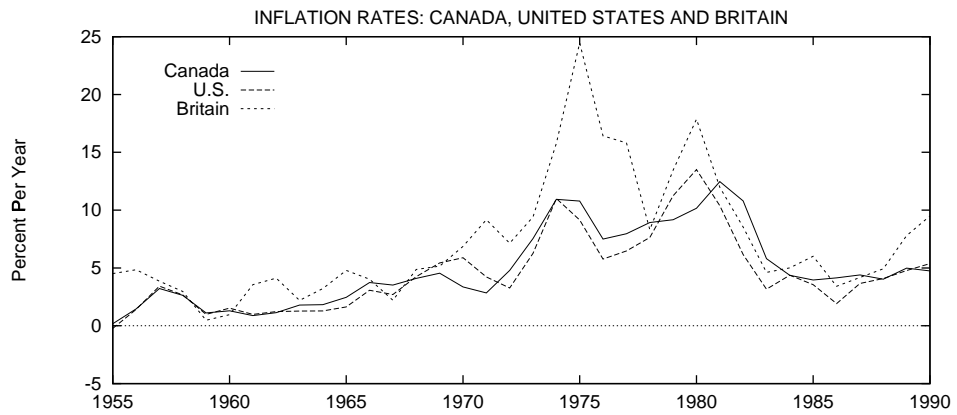


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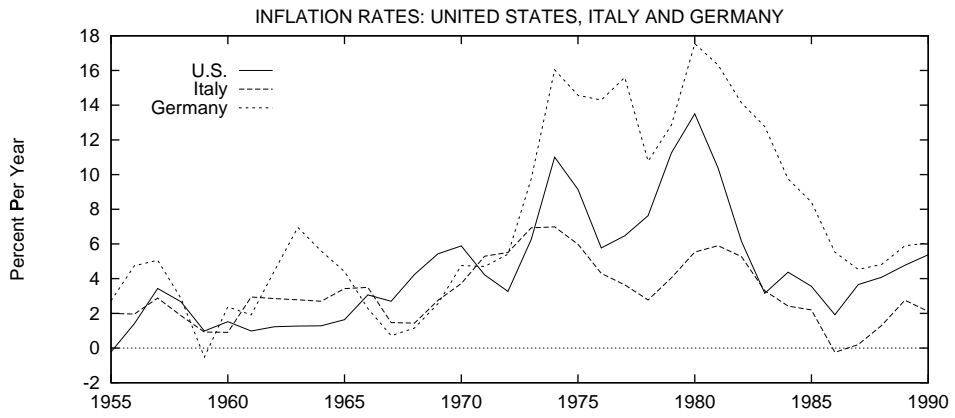


FIGURE 6.6:

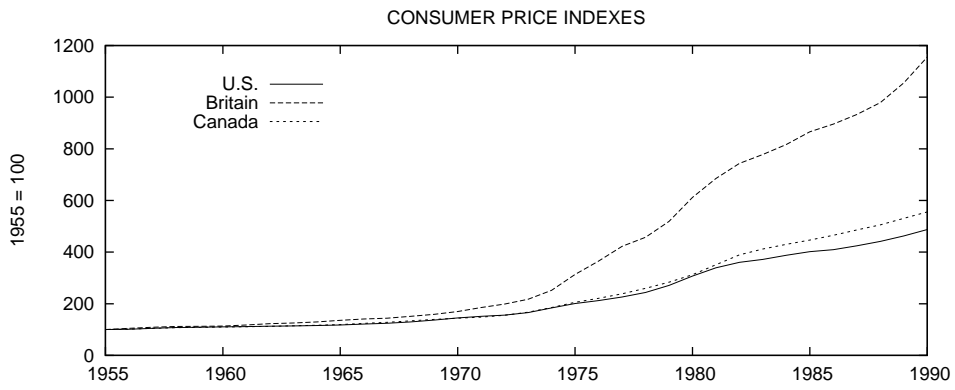
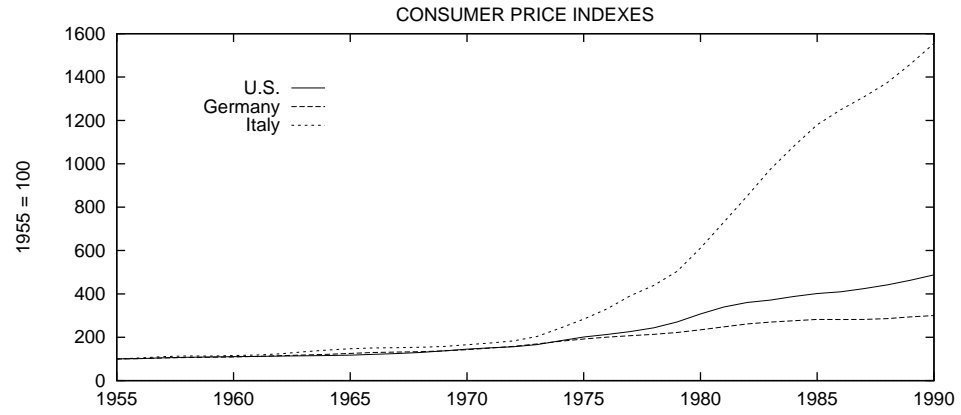


FIGURE 6.7:



Finally, it must be noted that inflation does not necessarily imply an increase in all prices in the economy—only the average level of prices need increase.

## Study Question

Consider an economy that produces three goods—widgets, gadgets and gramlets. The residents of the economy consume widgets and gadgets. Gramlets are the economy's sole capital good. The prices and quantities produced of the three goods during selected years were as follows:

Year	Widgets		Gadgets		Gramlets	
	Price	Quantity	Price	Quantity	Price	Quantity
1985	1.20	4887	3.58	2543	2.10	1820
1986	1.35	4991	4.21	2621	2.13	1910
1987	1.81	5001	3.40	2290	2.45	2045
1988	2.50	5555	5.40	2340	2.61	2180
1989	1.90	6666	5.20	2195	2.62	2256

Calculate nominal GNP, real GNP, the implicit GNP deflator, and the Consumer Price Index for each year on using 1985 as the base year. Why do the CPI and the GNP deflator differ?

(You should get \$20,594.90 for Real GNP and 150.4 for the CPI for the year 1989.)

## References

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