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Notes on a Simple Keynesian Model

These notes present a simple, real (i.e., nonmonetary) Keynesian macroeconomic model for comparison with the real neoclassical model studied in class. This material is useful in answering some of your discussion assignments.

A central feature of Keynesian models is that prices do not rapidly adjust to clear all markets. If markets clear through price adjustment, as in the neoclassical model, the quantities of output, consumption, employment, and other variables that occur in the economy are just the market-clearing quantities. In the absence of rapid price adjustment, the actual quantities must be determined by some other process. In the simple Keynesian model described here, quantity (i.e., output) adjustment itself brings about equilibrium.

The simple Keynesian model consists of two building blocks. The first is the equilibrium condition, which states that output (income) equals aggregate demand:

$$Y = Y^d. \tag{1}$$

In this extreme Keynesian model, aggregate supply plays no role in determining output. Possibly because of unemployed resources, output is assumed to adjust to meet demand.

The second building block is the set of equations that describe aggregate demand. If we deal with a closed economy, the three components of aggregate demand are consumption, investment, and government purchases. Consumption demand is given by the consumption function

$$C^d = C^* + \theta(Y - T^*),$$

where $0 < \theta < 1$. This function divides consumption into two parts. The first, C^*, is called *autonomous consumption* because it does not depend upon income. The second, $\theta(Y - T^*)$, is called *induced consumption* because changes in current after-tax income induce changes in this portion of consumption. Here, T^* denotes net taxes (i.e., taxes minus government transfer payments to persons). The asterisk indicates that in this simple model net taxes are assumed to be autonomous, meaning that they do not depend on income. The consumption function says that consumption equals C^* if after-tax income is zero and that each one-unit increase in current after-tax income increases consumption by a fraction θ. The fraction θ is known as the *marginal propensity to consume* (MPC).

Investment demand and government purchases are assumed to be entirely autonomous:

$$I^d = I^*$$

$$G^d = G^*.$$

The statement that investment and government purchases are autonomous simply means that they are unaffected by changes in income in the current period. They may be functions of other factors such as interest rates and expectations about the future.

Aggregate demand is the sum of these three components:

$$Y^d = C^* + \theta(Y - T^*) + I^* + G^*.$$

It is convenient to combine all elements of autonomous expenditure into a single quantity A^*. This results in the aggregate demand function

$$Y^d = A^* + \theta Y,$$

where $A^* = C^* - \theta T^* + I^* + G^*$ is total autonomous expenditure.

Equilibrium is found by equating output and aggregate demand (as in equation 1) and solving for output:

$$Y = A^* + \theta Y,$$

or

$$Y = A^*/(1 - \theta) \qquad (2)$$

The quantity $1/(1 - \theta)$ is known as the *multiplier*. The multiplier is positively related to the MPC. Equation (2) says that equilibrium output is equal to autonomous expenditure times the multiplier. Given the multiplier, changes in output result from changes in autonomous expenditure. A one-unit increase in autonomous expenditure raises output by $1/(1 - \theta)$ units.

The intuition behind the multiplier is as follows. The immediate effect of an increase in autonomous spending is to increase output, thus increasing the income of some households. These households spend a portion of their increased income, thus further increasing output and raising the income of still other households. These households in turn increase their consumption, and the process continues until the total increase in output equals the multiplier times the initial increase in autonomous spending. The larger is the MPC, the larger will be the increase in induced consumption at each stage of this process and the larger will be the ultimate increase in aggregate output.

This simple model contains no mechanism like price adjustment to assure that the equilibrium levels of output and employment are the full-employment levels. If autonomous aggregate demand is low, the economy can remain indefinitely in an equilibrium with output below the full-employment level. According to the Keynesian model, pulling the economy out of such an underemployment equilibrium requires increasing autonomous expenditure. The most direct way to accomplish this end is to increase government purchases of goods and services, and a somewhat less direct way is to stimulate consumer demand by reducing taxes and/or increasing transfer payments. These actions are examples of active fiscal policy.

As an example, suppose the MPC is 0.8 and autonomous expenditure is 1000. These figures imply a multiplier of 5 and output of 5000. If autonomous expenditure increases to 1300, output increases to 6500.

If the government is to implement active fiscal policy, it must know the value of the multiplier, which depends on the MPC. For example, suppose actual output is 5000 but full-employment output is 6000. If the multiplier is 5, as was assumed above, increased government purchases of 200 would raise output to its full-employment level. Alternatively, the government could cut taxes by 250. (Why is the required tax cut larger than the increase in government purchases?) However, if the MPC is only 0.6, implying a multiplier of 2.5, increased government purchases of 400 (or a tax cut of 666.7) would be required.

Historical Note: John Maynard Keynes published his *General Theory of Employment, Interest, and Money* in 1936. In addition to recurrent recessions before World War I, the United States had experienced severe economic contractions in 1921-22 and during the early 1930s. Keynes's home country of Great Britain had also suffered from prolonged high unemployment through much of the 1920s. The *General Theory* was the most influential attempt to explain such periods of prolonged unemployment. By ruling out rapid price adjustment as a viable equilibrating mechanism, Keynes devised a model in which persistent unemployment could result. The consumption function shown above was one of the most important pieces of the Keynesian model. Keynes referred to the behavior represented by that function as a "fundamental psychological law" according to which people "are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income." Although he discussed factors other than current income that might affect consumption, Keynes did not derive his consumption function from any explicit model of consumer behavior of the sort common in modern microeconomics. What factors other than current income might affect total consumption? Can all of these factors be adequately collapsed into the autonomous portion of consumption demand, or do they affect the MPC as well?