Deviations from full employment in a closed economy

Short-run equilibrium

Monetary and fiscal policy

Some key features we can ignore in the long run are crucial in the short run:

- many prices are sticky, wages are sticky—they do not jump to a new long-run equilibrium level in response to shocks
- stocks, not flows, dominate the determination of asset prices—including interest rates—and asset prices are fully flexible, even in the short run—they can jump
- the interest rate is affected monetary factors, not just real factors—the central bank sets the short-term rate, and the interest rate cannot in any case fall below zero

1. Economics of a recession

Consider a drop in investment demand—reduced optimism of firms. The classical closed economy model (lecture 2) achieves equilibrium through a drop in the interest rate—from \( r^1 \) to \( r^2 \) in Chart 1.

Chart 1

Long-run closed-economy equilibrium

In the short run, the interest rate is controlled by the central bank—if it does not recognize that the equilibrium interest rate has changed, and holds the interest rate at \( r^1 \), the economy suffers a deflationary gap—investment demand is insufficient to absorb full
employment savings. The level of income and employment drops below full employment, reducing the level of saving to the lower level of investment. As pictures, the problem is not too bad. Sooner rather than later the central bank would realize what the problem is and reduce the interest rate to the equilibrium level.

**Depression case**
Suppose the drop in investment demand is very large. In Chart 2 there is no rate of interest low enough to produce enough investment to employ all full-employment saving. People would not accept an interest rate below zero, because they could always hold cash instead (in a deflation, the real return on cash would be positive).

Thus the economy can get stuck in a *deflationary trap*, or spiral. Even an alert central bank may not be able to provide sufficient stimulus to get the economy out, no matter how much money it provides (*liquidity trap*). Something like this may have happened in the 1930s, and again in Japan in the 1990s—although in both cases monetary policy was inept, and not nearly aggressive enough.

These situations do not occur often. One reason is that we have learned how to deal with them, using the model developed by Keynes.
2. Aggregate demand or spending

Simple Keynesian model—short-run equilibrium
This applies to a depression economy—the interest rate is fixed at the lowest achievable level.

The identity for total spending is

\[ Y = C + I + G. \]

We consider both \( G \) and \( I \) exogenous. That is, \( G \) is set by policy, and \( I \) is determined just by volatile business expectations (this is a deliberate oversimplification—investment would be affected by demand, or sales, and the cost of borrowing, which is assumed given).

Consumption is endogenous, from the consumption function

\[ C = C(Y - T). \]

\( T = \) taxes – government transfers

The equilibrium level of output is where planned output is equal to aggregate demand. That is, where

\[ Y = C(Y - T) + I + G. \]
This short-run equilibrium is stable. Suppose firms increase output to $Y_2$.

At $Y_2$ output is above planned spending. Firms accumulate unwanted inventory. In the next period they cut output to reduce inventory. Output returns to $Y_1$. 

Keynesian multiplier
In the Keynesian model, a change in exogenous spending has a multiplier effect on aggregate demand because of the induced change in consumption that it causes. Consider an increase in government spending, $\Delta G$.

The change in aggregate demand is equal to the exogenous change in government spending plus the induced change in consumption:

$$\Delta Y = \Delta G + \Delta C$$

$$= \Delta G + MPC \Delta Y,$$

which solves for $\Delta Y$ as follows:

$$(1 - MPC) \Delta Y = \Delta G$$

divide by the term in parentheses

$$\Delta Y = \frac{1}{1 - MPC} \Delta G$$

or

$$\Delta Y = \frac{1}{MPS} \Delta G.$$

In this simple case the multiplier is $[1/(1 - MPC)]$ or $1 / MPS$. This is clearly greater than unity. The smaller the propensity to save, the larger is the multiplier.

The same multiplier results applies to any exogenous change in spending—e.g. investment, which in practice in quite volatile. Multiplier effects help to understand the business cycle—cumulative changes over time in spending that occasionally result in deviations from full employment or, on the other side, inflationary pressure.
3. Aggregate demand function—IS curve

We have to bring the interest rate back—it makes sense to hold it constant only in a deep depression—we have not seen this since the 1930s.

Previously we had the simple investment function $I = I(r)$. The relationship is negative—a downward-sloping investment demand curve. We can make this more general, to allow aggregate demand (or sales from the form’s point of view) also to affect investment:

$$I = I(Y, r).$$

Likewise, we can recognize that consumption demand too is interest sensitive: the consumption function becomes:

$$C = C(Y, r).$$

This implies an aggregate demand function:

$$I = I(Y, r).$$

This can be written in another way, by bringing all the $Y$ terms together (this is equivalent to recognizing all the induced, or multiplier, effects):

$$Y = f(r, G).$$

In a famous chart, this aggregate demand function is the IS curve.
If the central bank holds the interest rate constant at the floor level (zero in Chart 7), which would be sensible in a depression, the increase in $Y$ would be as given by the simple Keynesian multiplier.

If, however, the economy is close to full employment, the central bank would raise the interest rate, following a fiscal expansion, to forestall a possibly inflationary increase in spending.

4. Monetary and fiscal policy

The IS curve is a useful place to begin the analysis of stabilization policy. (The LM curve, which all textbooks present, makes the unrealistic assumption that the central bank controls the stock of money, whatever that might mean in practice. You do not need the LM curve to do policy analysis—it just makes all issues more complicated than they need be.)

Suppose the economy starts in equilibrium, and there is then a slump in investment demand. What are the policy options?
There are a variety of monetary/fiscal actions to keep the economy at full employment, in the face of the drop in investment demand.

The choices lay within the 2 extremes of pure fiscal and pure monetary policy.

- **Pure fiscal** A fiscal boost would push the IS curve back towards the original location, $IS_1$, and restore full employment at point A, with the original interest rate $r_1$.
- **Pure monetary** The central bank might employ a monetary stimulus, reducing the interest rate, to attain a new full-employment equilibrium at point B.

If both fiscal and monetary stimulus are applied, the result will be an intermediate point like C.