

Lecture Note 15: Keynes; Keynesian growth models

The contribution of **John Maynard Keynes** (1883 – 1946) is considered as the most important step in the development of economic theory in the 20th century, and it reestablished macroeconomics as a central part of economics after the marginalist breakthrough which dealt mainly with microeconomics (the terminology *micro-* and *macroeconomics* was introduced in the 1920s, mainly by Ragnar Frisch). Actually, Keynes wrote several books, but *The General Theory of Employment, Interest, and Money* from 1936 is the one which created the Keynesian revolution.

As we have seen, the basic idea of a disequilibrium between the aggregate supply and aggregate demand has been a recurrent theme even with the classical writers, and the use of government intervention to improve the lack of demand was under consideration in many countries, notably in Sweden. Also the considerations of investment and monetary policy were in the air, but the important contribution of Keynes was the to collect this different parts into a single theory explaining the disequilibrium and indicating how to mitigate the problems.

A very common (but recently challenged) viewpoint is that the first step in the Keynesian reorientation of economics must be the recognition of price stickiness – prices do not change smoothly and immediately to over- or undersupply, meaning that the equilibrium must be established through quantities instead of prices (what intuitively is a disequilibrium will be an equilibrium in the model where quantities are changing and prices are fixed). This actually points to what may be the essence of the Keynesian revolution, namely that it is not enough to look at equilibria and market clearing, one needs also a more detailed (and necessarily dynamic) analysis of how one gets there and what happens if leaving it. In a recent work, Marglin (2021) sets out to give a modern (in the sense of model-based) version of the essential content of the General theory, thereby clearing up several misunderstandings which occurred due to Keynes' formulation of his theory. Marglin emphasizes that the fundamentally new is the recognition that equality of supply and demand does not necessarily mean that the economy reached an equilibrium, and that the economy may adapt to many different ways to disequilibria.

The story told by the contemporary textbook versions of the Keynesian model was already in the *General Theory*, but the elaboration with the 45°-diagram or IS-LM came later, they are due to **John Hicks** (1904 – 89) (as are many of the by now well-established textbook ways of presenting economic theory) and **Alvin Hansen** (1887 – 1975), known as the “American Keynes”.

In the following we shall return to what happened to Keynes' ideas after Keynes. Here just a comment: in the late 1960s and 1970s, the new developments in the theory of general equilibrium theory led to a revival of interest in the *microeconomic founda-*

tions of the Keynesian model, and a general equilibrium model with fixed prices and quantity a was set up, mainly due to **Jacques Drèze** (1929 – 2022) and **Edmond Malinvaud** (1923 – 2015). Another direction, mainly staying within the macroeconomic context, was initiated in the 1980s with a renewed interest in modelling stickiness of prices rather than just taking this stickiness as given. We return to this later.

Michał Kalecki (1899 – 1970) was educated in Warsaw, moved in 1936 to England, worked subsequently here and in USA for international organisations, and returned to Warsaw in 1955. Kalecki had a wide sphere of interests but he was particularly interested in business cycle theory. The model outlined below (following Vaggi and Groenewegen, 2003), which was published in 1933, can be seen as an early version of the Keynesian model seen in a Marxian perspective.

The fundamental balancing equations of the model are

$$Y = W + P$$

$$Y = C + A,$$

where the first equation gives total income Y as consisting of wages W (workers do not save) and profits P , and the second gives the total output (equal to total income) as a sum of consumption C and accumulation of capital A . Capitalists use their income P for consumption C_c and accumulation,

$$P = C_c + A,$$

and with behaviour equation (a counterpart of the Keynesian consumption function)

$$C_c = B_c + \lambda P,$$

where $\lambda > 0$ is a given constant, we get that the equilibrium value of P is

$$P = \frac{B_c + A}{1 - \lambda},$$

which again is similar to the Keynesian multiplier expression. If we (as usual) assume proportionality between production and employment, so that $W = kY$ for some $k > 0$, we finally get that

$$Y = \frac{B_c + A}{(1 - k)(1 - \lambda)}.$$

The business cycle aspects come in when we consider the determination of A . Kalecki assumes that production of new capital goods take time, so that if investment I in form of construction of new capital goods is ordered at any given date, then it will be delivered only after ν periods, meaning that on average $D = I/\nu$ units will be

delivered in each period. In a stationary economy the capital equipment is constant, so that in the long run we will have that

$$\frac{\Delta K}{\Delta t} = D - U,$$

where U is the amount of capital worn out and scrapped.

The investment demand is assumed to depend on P in the form

$$\frac{I}{K} = F\left(\frac{P}{K}\right),$$

and assuming linearity of F we can write it as

$$I = m(B_c + A) - nK$$

for positive constants m and n . Now an exogenous increase in the demand for investment will give rise to a change in A as construction begins, and this in its turn influences in I which increases even more. Eventually K becomes larger and a reduction in investment sets in. All this is reflected in upwards and downwards movements in Y , i.e., in a business cycle.

Dynamic extensions of the Keynesian theory: The Harrod-Domar model. In all its essential parts, the *General Theory* deals with a short-term situation of an economy with unemployment, and the long-term development is only treated in broad outlines. An extension of his theory, using the basically the same approach to consider problems of growth and development, was provided almost simultaneously by another member of the group around Keynes, namely **Roy Harrod** (1900 – 1978), who published a book on trade cycles in 1936 and elaborated its arguments in a later work (1939), transplanting the basic Keynesian model to dynamic framework.

The purpose of Harrod's work was to set up a new method in economics in order to explain the business cycle. For this, he considered three growth rates,

- (a) the *actual* rate of growth,
- (b) the *warranted* rate of growth, and
- (c) the *natural* rate of growth.

The purpose was to combine the investment multiplier with what he called the *acceleration* principle. From the Keynesian analysis, we have the equation

$$Y = \frac{1}{s}I,$$

and if we add an equation saying that investment comes about as a response on

change in total income,

$$I = \alpha \Delta Y,$$

we get Harrod's fundamental equation

$$\frac{\Delta Y}{Y} = \frac{s}{\alpha}. \quad (1)$$

Thinking of the investment equation as expressing the investment desired or *warranted* for a change in output, we get that (1) expresses a growth rate which will leave investors satisfied with the development of the economy, but from which the economy may depart occasionally.

Based on this it is possible to analyze deviations giving rise to business cycles. Suppose that the actual rate of growth exceeded the warranted rate. Then actual investment would be smaller than what was desired (inventories were becoming undesirably low), and the response would be to increase the rate of growth of output in order to replenish inventories and meet the demand, but then again the actual rate of growth would be above the warranted rate. A similar case could be made if the actual growth rate was too low. This is what was later called the "knife-edge problem" of Harrod's model, but it is not as much an analysis of stability as an argument establishing the uniqueness of the warranted rate of growth.

When we add that the economy cannot grow faster than the production technology allows, we get the natural rate, and if it differs from the warranted rate, the economy will experience fundamental disequilibrium problems of either under- or overproduction.

Independently of Harrod, the American economist **Evsey Domar** (1914 – 1997) developed a similar model of growth based on Keynesian ideas, published in 1946. The main difference was the treatment of investment, where Domar assumed that investment triggers an increase in potential output,

$$\Delta Y_p = \sigma I.$$

In this way Domar added the long-term effects of investment in the form of extended productive capacity, while Keynes considered only the short-run demand effects of investment. Adding the short-term effects give another equation (the multiplier effect of changes in investment) and assuming that investment is such that the potential increase in output is realised, we get

$$\frac{1}{s} \Delta I = \sigma I \text{ or, equivalently, } \frac{\Delta I}{I} = s\sigma.$$

This expression is formally equal to (1) when we put $\sigma = \frac{1}{\alpha}$, so that it makes sense to

consider the two models as a single one, known as the Harrod-Domar model.

References:

- Marglin, S.A. (2021), *Raising Keynes – A Twenty-First-Century General Theory*, Harvard University Press, Cambridge, Massachusetts.
- Vaggi, G, and P.Groenewegen (2003), *A Concise History of Economic Thought*, Palgrave Macmillan.