Keynesian Macroeconomics 1930s–1950s

Take W as given, simply fixed in "short run"
flexible in "long run"

Because $P = MC$ or MC + markup, this is similar to taking P as given

M^S & G, T are controllable policy variables.

Key relationships:

$$Y = E(\overset{+}{Y}, \overset{-}{r}, \overset{+}{G}, \overset{-}{T}) \text{ or } Y(\overset{-}{r}, \overset{+}{G}, \overset{-}{T})$$ ← solve for Y

$$\frac{M^S}{P} = \left(\frac{M}{P}\right)^D = L(\overset{-}{i}, \overset{+}{Y})$$ ← "Demand for real money balances"

"The models... often directly specify relationships among aggregate variables" (Romer) rather than derive from microeconomic model with production functions, utility functions.

Keynesian Macro 1930s....

Keynes (1936)

Y = C + I

The aggregate demand function relates any given level of employment to the "proceeds" which that level of employment is expected to realise. The "proceeds" are made up of the sum of two quantities—the sum which will be spent on consumption when employment is at the given level, and the sum which will be devoted to investment. The factors which govern these two quantities are largely distinct.

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Determinants of C

We will therefore define what we shall call *the propensity to consume* as the functional relationship χ between Y_w, a given level of income in terms of wage-units, and C_w the expenditure on consumption out of that level of income, so that

$$C_w = \chi(Y_w) \text{ or } C = W \cdot \chi(Y_w).$$

p 90

Does r affect C? Maybe, maybe not

(4) *Changes in the rate of time-discounting*, i.e. *in the ratio of exchange between present goods and future goods.*—This is not quite the same thing as the rate of interest, since it allows for future changes in the purchasing power of money in so far as these are foreseen. Account has also to be taken of all kinds of risks, such as the prospect of not living to enjoy the future goods or of confiscatory taxation. As an approximation, however, we can identify this with the rate of interest.

The influence of this factor on the rate of spending out of a given income is open to a good deal of doubt. Over a long period substantial changes in the rate of interest probably tend to modify social habits considerably, thus affecting the subjective propensity to spend—though in which direction it would be hard to say, except in the light of actual experience. The usual type of short-period fluctuation in the rate of interest is not likely, however, to have much *direct* influence on spending either way. There are not many people who will alter their way of living because the rate of interest has fallen from 5 to 4 per cent, if their aggregate income is the same as before.

p. 92, 93

Keynesian ... 1930s

Keynes (1936)

Determinants of C (cont.)

Does expected future income affect C? Maybe, maybe not

(3)

(6) *Changes in expectations of the relation between the present and the future level of income.*—We must catalogue this factor for the sake of formal completeness. But, whilst it may affect considerably a particular individual's propensity to consume, it is likely to average out for the community as a whole. Moreover, it is a matter about which there is, as a rule, too much uncertainty for it to exert much influence.

Marginal propensity to consume $\partial C/\partial Y < 1$

Granted, then, that the propensity to consume is a fairly stable function so that, as a rule, the amount of aggregate consumption mainly depends on the amount of aggregate income (both measured in terms of wage-units), changes in the propensity itself being treated as a secondary influence, what is the normal shape of this function?

pp 96, 97

The fundamental psychological law, upon which we are entitled to depend with great confidence both *a priori* from our knowledge of human nature and from the detailed facts of experience, is that men 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. That is to say, if C_w is the amount of consumption and Y_w is income (both measured in wage-units) ΔC_w has the same sign as ΔY_w but is smaller in amount, *i.e.* $\frac{dC_w}{dY_w}$ is positive and less than unity.

This is especially the case where we have short periods in view, as in the case of the so-called cyclical fluctuations of employment during which habits, as distinct from more permanent psychological propensities, are not given time enough to adapt themselves to changed objective circumstances. For a man's habitual standard of life usually has the first claim on his income, and he is apt to save the difference which discovers itself between his actual income and the expense of his habitual standard; or, if he does adjust his expenditure to changes in his income, he will over short periods do so imperfectly. Thus a rising income will often be accompanied by increased saving, and a falling income by decreased saving, on a greater scale at first than subsequently.

1950's

Keynes (1936) (cont.)

Determinants of I

(4)

pp. 135, 136

WHEN a man buys an investment or capital-asset, he purchases the right to the series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of the asset. This series of annuities Q_1, Q_2 . . . Q_n it is convenient to call the *prospective yield* of the investment.

Over against the prospective yield of the investment we have the *supply price* of the capital-asset, meaning by this, not the market-price at which an asset of the type in question can actually be purchased in the market, but the price which would just induce a manufacturer newly to produce an additional unit of such assets, *i.e.* what is sometimes called its *replacement cost*. The relation between the prospective yield of a capital-asset and its supply price or replacement cost, *i.e.* the relation between the prospective yield of one more unit of that type of capital and the cost of producing that unit, furnishes us with the *marginal efficiency of capital* of that type. More precisely, I define the marginal efficiency of capital as being equal to that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price.

If there is an increased investment in any given type of capital during any period of time, the marginal efficiency of that type of capital will diminish as the investment in it is increased, partly because the prospective yield will fall as the supply of that type of capital is increased, and partly because, as a rule, pressure on the facilities for producing that type of capital will cause its supply price to increase; the second of these factors being usually the more important in producing equilibrium in the short run, but the longer the period in view the more does the first factor take its place. Thus for each type of capital we can build up a schedule, showing by how much investment in it will have to increase within the period, in order that its marginal efficiency should fall to any given figure. We can then aggregate these schedules for all the different types of capital, so as to provide a schedule relating the rate of aggregate investment to the corresponding marginal efficiency of capital in general which that rate of investment will establish. We shall call this the investment demand-schedule; or, alternatively, the schedule of the marginal efficiency of capital.

1950s

Keynes (1936)

Determinants of I (cont.)

Now it is obvious that the actual rate of current investment will be pushed to the point where there is no longer any class of capital-asset of which the marginal efficiency exceeds the current rate of interest. In other words, the rate of investment will be pushed to the point on the investment demand-schedule where the marginal efficiency of capital in general is equal to the market rate of interest.[1]

Demand for Money Balances

But this decision having been made, there is a further decision which awaits him, namely, in *what form* he will hold the command over future consumption which he has reserved, whether out of his current income or from previous savings. Does he want to hold it in the form of immediate, liquid command (*i.e.* in money or its equivalent)? Or is he prepared to part with immediate command for a specified or indefinite period, leaving it to future market conditions to determine on what terms he can, if necessary, convert deferred command over specific goods into immediate command over goods in general? In other words, what is the degree of his *liquidity-preference*—where an individual's liquidity-preference is given by a schedule of the amounts of his resources, valued in terms of money or of wage-units, which he will wish to retain in the form of money in different sets of circumstances?

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Thus the rate of interest at any time, being the reward for parting with liquidity, is a measure of the unwillingness of those who possess money to part with their liquid control over it. The rate of interest is not the "price" which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption. It is the "price" which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash;—which implies that if the rate of interest were lower, *i.e.* if the reward for parting with cash were diminished, the aggregate amount of cash which the public would wish to hold would exceed the available supply, and that if the rate of interest were raised, there would be a surplus of cash which no one would be willing to hold. If this explanation is correct, the quantity of money is the

p 167

Liquidity-preference is a potentiality or functional tendency, which fixes the quantity of money which the public will hold when the rate of interest is given; so that if r is the rate of interest, M the quantity of money and L the function of liquidity-preference, we have $M = L(r)$. This is where, and how, the quantity of money enters into the economic scheme.

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1950s

Keynes (1936)

Demand for Money Balances (cont.)

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The three divisions of liquidity-preference which we have distinguished above may be defined as depending on (i) the transactions-motive, *i.e.* the need of cash for the current transaction of personal and business exchanges; (ii) the precautionary-motive, *i.e.* the desire for security as to the future cash equivalent of a certain proportion of total resources; and (iii) the speculative-motive, *i.e.* the object of securing profit from knowing better than the market what the future will bring forth.

p 170, 200

Whilst the amount of cash which an individual decides to hold to satisfy the transactions-motive and the precautionary-motive is not entirely independent of what he is holding to satisfy the speculative-motive, it is a safe first approximation to regard the amounts of these two sets of cash-holdings as being largely independent of one another. Let us, therefore, for the purposes of our further analysis, break up our problem in this way.

Let the amount of cash held to satisfy the transactions- and precautionary-motives be M_1, and the amount held to satisfy the speculative-motive be M_2. Corresponding to these two compartments of cash, we then have two liquidity functions L_1 and L_2. L_1 mainly depends on the level of income, whilst L_2 mainly depends on the relation between the current rate of interest and the state of expectation. Thus

$$M = M_1 + M_2 = L_1(Y) + L_2(r),$$

where L_1 is the liquidity function corresponding to an income Y, which determines M_1, and L_2 is the liquidity function of the rate of interest r, which determines M_2.

Keynesian Macroeconomics ... 1950s

J. R. Hicks 1937

(7)

IT WILL BE ADMITTED by the least charitable reader that the entertainment value of Mr. Keynes' *General Theory of Employment* is considerably enhanced by its satiric aspect. But it is also clear that many readers have been left very bewildered by this Dunciad.

Let us begin by assuming that w, the rate of money wages per head, can be taken as given.

Let x, y, be the outputs of investment goods and consumption goods respectively, and N_x, N_y, be the numbers of men employed in producing them. Since the amount of physical equipment specialised to each industry is given, $x = f_x(N_x)$ and $y = f_y(N_y)$, where f_x, f_y, are *given* functions.

Let M be the *given* quantity of money.

It is desired to determine N_x and N_y.

First, the price-level of investment goods = their marginal cost = $w(dN_x/dx)$. And the price-level of consumption goods = their marginal cost = $w(dN_y/dy)$.

Income earned in investment trades (value of investment, or simply Investment) = $wx(dN_x/dx)$. Call this I_x.

Income earned in consumption trades = $wy(dN_y/dy)$.

Total Income = $wx(dN_x/dx) + wy(dN_y/dy)$. Call this I.

In order to determine I_x, we need two equations. One tells us that the amount of investment (looked at as demand for capital) depends upon the rate of interest:

$$I_x = C(i).$$

This is what becomes the marginal-efficiency-of-capital schedule in Mr. Keynes' work.

Further, Investment = Saving.

Mr. Keynes begins with three equations,

$$M = L(i), \quad I_x = C(i), \quad I_x = S(I).$$

These differ from the classical equations in two ways. On the one hand, the demand for money is conceived as depending upon the rate of interest (Liquidity Preference). On the other hand, any possible influence of the rate of interest on the amount saved out of a given income is neglected. Although it means that the third equation becomes the multiplier equation, which performs such queer tricks, nevertheless this second amendment is a mere simplification, and ultimately insignificant.[4] It is the liquidity preference doctrine which is vital.

Keynesian — 1950s

J. R. Hicks (1937)

Like Lavington and Professor Pigou, Mr. Keynes does not in the end believe that the demand for money can be determined by one variable alone—not even the rate of interest. He lays more stress on it than they did, but neither for him nor for them can it be the only variable to be considered. The dependence of the demand for money on interest does not, in the end, do more than qualify the old de-

Consequently we have for the General Theory

Note: C is not Consumption

$$M = L(I, i), \quad I_x = C(i), \quad I_x = S(I).$$

Let us have recourse to a diagram (Figure 1).

Y

Why is S a Function of I?

I = S + Consumption (I)

S = I − Consumption (I)

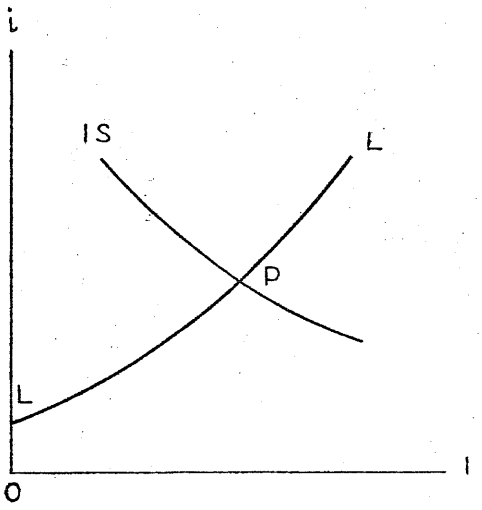

FIGURE 1

Against a given quantity of money, the first equation, $M = L(I, i)$, gives us a relation between Income (I) and the rate of interest (i). This can be drawn out as a curve (LL) which will slope upwards, since an increase in income tends to raise the demand for money, and an increase in the rate of interest tends to lower it. Further, the second two equations taken together give us another relation between Income and interest. (The marginal-efficiency-of-capital schedule determines the value of investment at any given rate of interest, and the multiplier tells us what level of income will be necessary to make savings equal to that value of investment.) The curve IS can therefore be drawn showing the relation between Income and interest which must be maintained in order to make saving equal to investment.

Keynesian — 1950s

Hicks (1937) cont.

With that apparatus at our disposal, we are no longer obliged to make certain simplifications which Mr. Keynes makes in his exposition. We can reinsert the missing i in the third equation, and allow for any possible effect of the rate of interest upon saving; and, what is much more important, we can call in question the sole dependence of investment upon the rate of interest, which looks rather suspicious in the second equation. Mathematical elegance would suggest that we ought to have I and i in all three equations, if the theory is to be really General. Why not have them there like this:

$$M = L(I, i), \quad I_x = C(I, i), \quad I_x = S(I, i)?$$

Once we raise the question of Income in the second equation, it is clear that it has a very good claim to be inserted. Mr. Keynes is in fact only enabled to leave it out at all plausibly by his device of measuring everything in "wage-units," which means that he allows for changes in the marginal-efficiency-of-capital schedule when there is a change in the level of money wages, but that other changes in Income are deemed not to affect the curve, or at least not in the same immediate manner. But why draw this distinction? Surely there is every reason to suppose that an increase in the demand for consumers' goods, arising from an increase in employment, will often directly stimulate an increase in investment, at least as soon as an expectation develops that the increased demand will continue. If this is so, we ought to include I in the second equation, though it must be confessed that the effect of I on the marginal efficiency of capital will be fitful and irregular.

Romer (p. 220)

$$E = E(Y, i - \pi^e, G, T), \quad 0 < E_Y < 1, \; E_{i-\pi^e} < 0, \; E_G > 0, \; E_T < 0. \tag{5.1}$$

Here E is planned real expenditure, Y is real output, i is the nominal interest rate, π^e is expected inflation, G is real government purchases, and T is real taxes. E_Y, $E_{i-\pi^e}$, and so on denote the partial derivatives of $E(\bullet)$. G, T, and π^e are all taken as given.[2] The negative effect of the real interest rate on planned expenditure operates through firms' investment decisions and through consumers' purchases, particularly of durable goods. Planned expenditure is assumed to increase less than one-for-one with income; that is, $0 < E_Y < 1$.

In textbook treatments, E is often expressed in terms of its component parts, and strong assumptions are made about how the determinants of planned expenditure enter. A standard formulation is

$$E = C(Y - T) + I(i - \pi^e) + G, \tag{5.2}$$

where $C(\bullet)$ is consumption and $I(\bullet)$ is investment. The restrictions imposed in this specification may be highly unrealistic. For example, there is considerable evidence that the real interest rate affects consumption, and almost overwhelming evidence that income influences investment. To give another example, there is little basis for assuming that income and taxes have equal and opposite effects on spending. Since the general formulation in (5.1) is only slightly more difficult, we will use it in what follows.