3.   The Propensity to Consume

After the 'digression' of *G.T.* Book II, in *G.T.* Books III and IV Keynes continues the process of detailed articulation of the principle of effective demand outlined in *G.T.* Chapter 3, by addressing the two components of the aggregate demand function, the demand for the production of consumption- and capital-goods respectively. Recall that the aggregate supply function Z provides a direct relation between the level of employment N and the money-income required by entrepreneurs to warrant that level of employment: the causation runs from required income to employment. The other blade of the Marshallian scissors is the aggregate demand function, the relationship between the level of employment N and the value of aggregate demand D, where the causation runs from employment to the income expected by entrepreneurs. It is vital to bear in mind the point made in the last chapter, that in this part of *The General Theory* Keynes switches from the study of entrepreneurial expectations to the expenditure decisions of consumers and investors, which are linked only loosely through factor income and the state of expectation. Keynes might helpfully have been more explicit about this, although he does distinguish at the outset of his discussion between the '"proceeds" which that level of employment is expected to realise' and the 'proceeds' themselves (*G.T.* 89), and makes his working assumption a little clearer in section IV of *G.T.* Chapter 10 (*G.T.* 122).

The separation of the discussions of consumption and investment into *G.T.* Books III and IV corresponds to the division between short-term and long-term expectation made in *G.T.* Chapter 5. While discussing consumption, Keynes takes as given the views about the future demand conditions for the services of individual capital-goods whose life extends beyond the period of production, which are expressed as the state of long-term expectation. Making long-term expectation exogenous, i.e. temporarily given, is legitimate because of the brevity of the short and long periods, which correspond to the day and the period of production. The state of long-term expectation is a complex affair involving many elements of both supply and demand (*G.T.* 147), but it is certain that long-term demand conditions will be unaffected by changes in the capacity of the capital equipment during the single day while the new capital-goods are being produced but have not yet

been installed, and it is at least plausible, for the theoretical purposes of Keynes's long period, that the state of long-term expectation is unaffected by changes in capacity in the short term.

G.T. Book IV and Chapter 4 of this book accordingly address the determinants of the demand for capital-goods, and the level of employment in each of the capital-goods industries (together making what Keynes calls the 'primary' employment) follows directly from their aggregate supply functions. The purpose of the present chapter and *G.T.* Book III is to provide the required relation between the rate of current investment and the level of total employment, in both capital- and consumption-goods industries, using the concept of the propensity to consume. *G.T.* Book III therefore closes the model and completes the theory of employment, for a *given* state of expectation and liquidity-preference.

The aim of this chapter is to clarify and explain *G.T.* Book III (*G.T.* Chapters 8–10) in terms of three main themes: the distinction between the average and marginal propensity to consume (Section 3.1); the relation between consumption and employment (Section 3.2); and the definition of the multiplier (Section 3.3). These themes respond, not directly to the three *G.T.* chapters, but to difficulties that have arisen in their interpretation.

We reach the interesting conclusions that Keynes offered no formal theory (meaning, in this context, an equilibrium theory in the mechanical sense) of the *level* of consumption out of income; did not assume a closed economy without foreign trade, government or corporations; and that the 'sequence' multiplier of Old Keynesian economics cannot be found in *The General Theory*. The empirical basis of the claim that the marginal propensity to consume is less than unity proves to be, quite simply, the observation of a market value for aggregate output, and the multiplier is a corollary of market-period equilibrium.

3.1   AVERAGE AND MARGINAL

G.T. Book III presents Keynes's case for assuming a stable functional relation between the aggregate values of consumption and money-income, a relation he defines as 'the propensity to consume'. The relation is functional since Keynes proceeds to differentiate it in order to arrive at the marginal propensity to consume. The question of its stability raises important issues that have occupied much of the literature.

Stability must be defined always in relation to something, and a failure to recognise the point of reference leads to much confusion. In particular,

stability in relation to income does not mean stability over time, or in relation to anything else. Once again, Keynes's use of periods and the distinction between the short and the long term are of paramount importance, if his meaning is to be grasped. The principle of effective demand operates in Keynes's short period, the day, and the calendar length of Keynes's long period is within the horizon of short-term expectation. As will be shown below, the propensity to consume must be considered stable for the duration of the (short-term) long period if the 'normal' value of the multiplier is to be observed. The need to concentrate on the short term explains Keynes's division (*G.T.* 91) between the short-term objective influences on the propensity to consume considered in *G.T.* Chapter 8 and the long-term subjective influences considered in *G.T.* Chapter 9.

The propensity to consume is defined as a function χ relating the aggregate money-values of consumption (C_w) and income (Y_w), both measured in terms of wage-units (*G.T.* 90), such that $C_w = \chi(Y_w)$. Note that Keynes uses the same symbol χ here as when defining aggregate consumption demand in terms of entrepreneurial expectations $D_1 = \chi(N)$ in *G.T.* Chapter 3, in line with his assumption that factor income is a sufficient proxy for effective demand and employment for the purposes of consumption (this is part of the 'switch' discussed above). ▶ **A3.2.1** We shall see shortly that this switch from employment to income is a necessary element of the definition of the multiplier as a 'market-period' equilibrium relationship. As with the corresponding measures of D_w and Z_w, this definition in terms of wage-units eliminates changes in the money-wage from the outset as a direct influence on effective demand.

Although Keynes places most emphasis on the effect of various factors in *changing* the propensity to consume, he is also concerned about its *level*. The term 'average' rather than 'level' must be used with care, since it suggests a stability of the propensity to consume, beyond the short term and with respect to influences other than income, which Keynes is quite careful not to assume. Strictly, 'average' should be interpreted in relation to a *given* propensity to consume function, as when Keynes refers to the 'average marginal propensity to consume' (*G.T.* 121). ▶ **A3.1.1**

In enumerating the possible sources of short-term changes in the level of consumption, he rules out influences other than 'real' income (i.e. money-income expressed in wage-units) as being either too slow to change (all the subjective factors), too unpredictable or exogenous (windfall changes, changes in income prospects, changes in fiscal policy) or second order (changes in the distribution of income, in the difference between income and net income, and in the rate of interest). Nevertheless in settling upon the

marginal propensity to consume $\partial C_w/\partial Y_w$ as the key partial derivative for theoretical purposes, he emphasises that the other influences must be kept 'at the back of our heads' even if explicit account cannot be taken of them in the form of 'partial differentials' (*cf G.T.* 275, 297).

By contrast with its second-order influence on *changes* in the propensity to consume, the difference between income and net income is, in Keynes's opinion, a major determinant of the *level* of the propensity to consume. The whole of section IV of *G.T.* Chapter 8 (*G.T.* 98–106) is devoted to the contemporary empirical evidence in support of this contention: to the difference between financial and physical provision for the future, and the suggestion of a widening gap between the two as a community accumulates wealth.

On the other hand Keynes makes no mention at all in *The General Theory* of the 'real balance' or 'Pigou' effect which plays so large a role in modern AD/AS macroeconomics, which might be written $\partial C_w/\partial M_w$. Partly this is because he discusses changes in the price-level at length in *G.T.* Chapter 19, but even there he makes no allowance for a direct influence on the propensity to consume. We can only speculate why he did not consider it worth even a mention, after making a fairly exhaustive inventory of the other possible influences on the propensity to consume. A number of possible reasons are consistent with the rest of *The General Theory*. Firstly, although *The General Theory* does not discuss 'technical monetary detail' (*G.T.* xxii), the author of *A Treatise on Money* may be taken to assume that in a modern economy the bulk of money is in the form of bank deposits, so that a falling price-level harms bank debtors as much as it benefits bank depositors: so there is no significant aggregate real balance effect to discuss. If money is assumed to take the form only of state paper or a commodity, the windfall gain to its holders must still have set against it the distributional effects of windfall transfers from non-bank debtors to creditors, including the increased real value of government debt service. If by a heroic assumption, easily hidden by the Classical method of treating money as otherwise neutral, we go still further to abstract from all debt or at least the related distributional effects, any positive *short-term* influence of the real balance effect on consumption (through windfall gains) is likely to require such a rapid change in the price-level as to amount to a 'hyper-deflation', something neither observed in practice nor conducive to confidence and employment. Finally, any *long-term* real balance effect, even in such a debt-free and bank-free economy, implies that the propensity to consume rises with an increase in real income and wealth, while Keynes explicitly assumes the opposite case as a rule (*G.T.* 31,

97). Taken together, these reasons suggest that his omission of the real balance effect is entirely deliberate.[1]

Nevertheless there is nothing in the formal analysis of *The General Theory* to suggest that the average propensity to consume must fall as the real income of the community increases over time (as Keynes acknowledges, *G.T.* 97), nor is any such tendency its main conclusion. Although the average propensity to consume must fall for a change in income at a given point in time, if the marginal propensity to consume is less than the average, this statement says nothing about shifts in the level of the propensity to consume over time. Keynes can make no allowance in an equilibrium model for innovations in technology and consumption. The crucial element of his analysis of consumption is that the marginal propensity to consume must be less than unity, for reasons of stability discussed further below. Conversely his analysis of the influence of the rate of interest suggests no significant or unambiguous effect on the propensity to consume in either the short or long term, while maintaining the Classical inverse relationship between the rate of interest and the rate of current investment. The development of consumer credit in its various forms merely strengthens Keynes's case: a rise in the rate of interest will deter not only current investment but also debt-financed consumption, reducing the propensity to consume but doing nothing to increase saving, which must reduce in line with current investment. Higher interest rates thus lead only to reduced current investment *and* consumption at a lower level of income and employment. The more sensitive are current investment and the propensity to consume to the rate of interest, the more the level of income will have to fall. The equilibrium propensity to spend on new goods (in either form) may be sensitive to the rate of interest, but saving is determined solely by current investment and is accordingly *inversely* related to the rate of interest, the opposite to the postulate of Classical theory. Only at full employment is there a trade-off between current investment and consumption, and even then it is not clear that the rate of interest is an important influence on the balance between them.

Unlike Classical theory, Keynes does not claim to offer a theory of the *level* of the propensity to consume, which is largely determined by a complex psychological response to the unknown future, made up of motives such as 'Precaution, Foresight, Calculation, Improvement, Independence, Enterprise, Pride and Avarice', no more suitable as 'material for the differential calculus' than the merits of Queens (*G.T.* 40), and certainly not a simple matter of the rate of interest.[2]

3.2   CONSUMPTION AND EMPLOYMENT

Keynes's exogenous, psychological, short-term propensity to consume replaces the Classical, long-term, long-period equilibrium between consumption and investment. The definition of income and the investment-saving identity discussed above in Chapter 2 refute *a priori* the idea that saving is brought into equilibrium with current investment by the rate of interest. *G.T.* Book III provides instead an explanation of the relationship between the equilibrium levels of consumption and current investment and their corresponding levels of employment in a competitive monetary production economy where the level of employment is not determined simply by the supply of available labour. It is a vital part of the story, since it demonstrates formally the 'fallacy of composition' and shows precisely how an individual decision to abstain, from either consumption or investment of income, reduces the level of aggregate income rather than increasing aggregate current investment.

Consumption takes place when an entrepreneur makes a sale to a consumer. If goods are sold from stock and not replaced, this consumption represents user cost, the consumption of capital, and not income: consumption of goods (unlike services) does not necessarily create income. Income arises from production and employment, and is the value of the output produced, so Keynes's interest in consumption and investment derives ultimately from the employment created by each activity. The relevance of the propensity to consume is thus in the end about the decisions of entrepreneurs to hire labour and other factors to produce consumption goods and services, and it is the expectations of entrepreneurs (including dealers), rather than the intentions of consumers, which directly determine employment; even though those expectations ultimately depend upon the expenditure decisions of consumers and investors. ► **A3.2.1**

Since Keynes's concern, therefore, is with the employment consequences of decisions to consume and invest, the identity of the consumers and investors is not of fundamental importance. Contrary to received wisdom, *The General Theory* allows for government, foreign trade and the corporate sector, and it is not a model which describes only a closed economy. Keynes clearly regards differences in behaviour between these sectors and the personal sector as important for applied economics, and indeed devotes a large section (*G.T.* 98–104) to the empirical significance of corporate depreciation allowances. He also explicitly considers fiscal policy (*G.T.* 94-5) and foreign trade in his discussion of the likely value of the multiplier (*G.T.* 120–22). Yet his main object in *The General Theory* is not to place specific

values on variables, but to establish general principles of causation that are independent of the degree to which an economy is open. For this purpose it is sufficient to consider the propensity to consume of the community as a whole, where a community means the population of any given geographical area with its associated stock of capital-goods, and to abstract from the particular institutions by which the community is organised, other than those of the market. The demand of the foreign sector for consumption-goods is largely independent of domestic employment, but so indeed is the demand of domestic rentiers, and both can be accommodated within the aggregate propensity to consume. Similarly, the demand for imports is not for this purpose fundamentally different from domestic saving, since both represent decisions not to consume domestically produced consumption-goods. Government, like the rentier, is in a position to spend on consumption- or capital-goods an amount in excess of its income funded by deficit financing or asset sales, but this raises no issue of fundamental principle in the present context. The implications of trade policy are briefly considered in *G.T.* Book VI.

3.3   INCOME, EFFECTIVE DEMAND AND THE MULTIPLIER

Keynes's ultimate objective is to show how the equilibrium of a competitive monetary production economy is determined, not by the supply of available labour, but by the point of effective demand. In the Classical system the division of output between investment and consumption is determined by the rate of interest (strictly, by the rate of time-discounting), while output itself is determined in the labour market by the second postulate, by the equilibrium between the marginal revenue product and marginal disutility of labour. In Keynes's system, consumption is determined by current investment without reference to the supply of available labour, through the level of income; the equilibrium between current investment and consumption is reflected in the 'multiplier' relationship between current investment and income.

Keynes's *investment* multiplier must be understood as in the first instance a relation between aggregate income, current investment and consumption, that follows directly from the definition of aggregate income as the sum of the values of current investment and consumption. Income is a matter of price as well as quantity, and prices may change to clear each industry's product market each day. The multiplier is a corollary of the existence of a market value for aggregate output, in other words, of the temporary equilibrium of

the daily market period. The Appendix to this Chapter contains a mathematical proof that if equilibrium market prices can be observed, the marginal propensity to consume must be less than unity. This 'fundamental psychological law' follows directly from the observation of a set of market prices for output and is therefore, as Keynes states, a matter of logic, not an *ad hoc* assumption. The marginal propensity to consume, as we have seen above, is a separate matter from the level of the propensity to consume, of which Keynes offers no equilibrium analysis because of its dependence on the long-term future, and which the short term of his long period allows him to take as largely independent of influences other than 'real' money-income. The existence of a market value for aggregate output corresponds both to a value of the marginal propensity to consume below unity and to the traditional Marshallian conditions for the stability of equilibrium in each industry. ▶ **A3.3.1**

However, as we have seen in Chapter 1, employment is determined by effective demand, while income and effective demand are not the same thing. Old Keynesian economics simplifies matters by assuming they coincide in equilibrium, thus allowing current investment and the multiplier to determine employment directly through expenditure and income. The main problem with 'the neo-classical synthesis' is that it is not as Classical as Keynes. Aggregate demand substitutes for effective demand and is interpreted as expenditure rather than income at various different future dates; homogeneous output replaces deflated money-income and ignores the problems addressed by user cost; the multiplier becomes a sequence of rounds of expenditure, income and leakages; while investment and the price-level are exogenous. Competition, relative prices, expectation, and aggregate supply disappear from the model completely. The contribution of modern Classical economists in insisting on the resurrection of these key elements of economic theory must be acknowledged.

The Old Keynesian interpretation was, no doubt, encouraged by the fact that there is no mention of effective demand in *G.T.* Book III, and Keynes here does indeed for the most part treat income and effective demand as equivalent, for the reasons already given. *G.T.* Book III, shorn of most of the rest of *The General Theory*, is the core of Old Keynesian economics. Only section IV of *G.T.* Chapter 10 reminds the reader of the importance of expectation and supply, yet this section, intended by Keynes to reduce confusion over the nature of the multiplier, seems mainly to have increased it.

The multiplier is first and foremost a marginal condition at a *point* of equilibrium, as expressed by Keynes in his definition of the marginal propensity to consume as the formal derivative dC/dY (*G.T.* 115), a concept

from the *infinitesimal* calculus. In that context it is appropriate to describe the multiplier as establishing 'a precise relationship, given the propensity to consume, between aggregate employment and income and the rate of investment' (*G.T.* 113, *C.W.* XIV, p. 121), rather than between *changes* in these variables. This represents the 'logical theory of the multiplier, which holds good, continuously, without time lag, at all moments of time' (*G.T.* 122). Secondly, if (and only if) it can be assumed that the propensity to consume is a stable function over time, the multiplier can be calculated as the ratio between the observed changes in income and current investment over a period of time (e.g. *G.T.* 127). Thirdly, if in addition the change in current investment is fully anticipated, those observed changes will reflect the 'normal' or long-period equilibrium value of the multiplier (*G.T.* 123, 125). These three multipliers, and others, are explored further in Section **A3.3.2**.

3.4 SUMMARY

Keynes offers no equilibrium theory of the level of consumption, and his claim that the marginal propensity to consume is less than unity is a simple corollary of the existence of a market value for output (i.e. of the existence of money-income). The Pigou effect does not appear in *The General Theory*, not because Keynes overlooked it, but mainly because it is inconsistent with an economy based largely on bank-money, and because Keynes was of the informal view that increases in real income and wealth would reduce the propensity to consume rather than increase it. The long-term Pigou effect has in any case no place in a short-term theory of employment.

Keynes presents employment as determined by entrepreneurial expectations in the first instance, but those expectations ultimately depend on the expenditure decisions of consumers and investors. The identity of the consumers and investors is not of fundamental theoretical importance, so that *The General Theory* is not a model of a closed economy without government or corporations. The multiplier is a condition of equilibrium that follows directly from the observation of a market value for output and holds good continuously at any time; it may be measured by comparing two positions of equilibrium over time only if the propensity to consume is assumed to be constant. It is a matter entirely of income and market prices, rather than effective demand and expected prices.

NOTES

1. Tobin records the Kalecki and Fisher critiques of the Pigou effect and of Leontief's quip that if the price-level fell sufficiently, the entire national income could be purchased 'with a dime'. He concludes that the long-term Pigou effect has no place in a world of historical time, but argues that Keynes 'did not show the existence of an excess-supply equilibrium, at least not in the meaning of the magic word equilibrium in the Classical, or neo-Classical, economics he was criticizing. In that meaning, equilibrium is a stationary state, and *a state in which expectations are fulfilled*' (1980, emphasis added).
2. Bunting (2001) offers an important methodological critique of the empirical analysis cited in support of Friedman's permanent income hypothesis, similar to McCombie's critique of the 'empirical' aggregate production function (McCombie, 2001a, 2001b).

Appendix to Chapter 3

A3.1   AVERAGE AND MARGINAL

A3.1.1   Patinkin and the proportional multiplier

Footnote 2 of *G.T.* 126 presents a general formula of the relation between the average and marginal propensity to consume and a short description of its meaning, that Patinkin (1978) has discovered to be imprecise. The 'proportional multiplier' or 'investment-elasticity of income' can be written

$$\varepsilon_{Y,I} = \frac{dY}{Y} \bigg/ \frac{dI}{I} = \frac{1 - \dfrac{C}{Y}}{1 - \dfrac{dC}{dY}} = \frac{APS}{MPS}$$

where APS and MPS refer to the average and marginal 'propensity to save' (this is merely short-hand for the mathematical expressions and not a useful economic concept). Keynes states 'As wealth increases dC/dY diminishes, but C/Y also diminishes. Thus the fraction [$\varepsilon_{Y,I}$ above] increases or diminishes according as consumption increases or diminishes in a smaller or greater proportion than income.'

This final statement is correct if the marginal propensity to consume is constant and the change in the average propensity to consume results solely from the difference between the average and marginal propensity to consume, since $dAPS/dY > 0$ if $MPS > APS$. However, if the marginal propensity to consume changes with income (as it does in the worked example on the same page) the condition for $\varepsilon_{Y,I}$ to increase with income becomes

$$\varepsilon_{APS,Y} > \varepsilon_{MPS,Y}$$

where this expression means that the income-elasticity of the average propensity to save exceeds the income-elasticity of the marginal propensity to save. This need not always be the case, although it is so in Keynes's example.

The reader as meticulous as Patinkin will also find that the figure of 6,900,000 in the example on the same page should be 7,300,000, if Keynes is working to the nearest 100,000, as he does on the next page (*G.T.* 127).

A3.2   CONSUMPTION AND EMPLOYMENT

A3.2.1   Factor income and effective demand

Keynes is careful to point out (*G.T.* 90) that 'real' income (in the sense of money-income measured in wage-units) is merely a proxy for employment and that the correspondence is not necessarily unique.[1] In terms of our earlier notation, there may be a set of different distributions of employment, of vectors {**n**} with the same scalar value N, but different levels of effective demand $D*$ and of current income Y. There is no suggestion of Hansen's assumption that employment can properly be proxied by a measure of homogeneous output (truly real, as opposed to 'real', income), which contradicts *G.T.* Chapter 4. The difference between distributions of the same aggregate employment is not important provided that it is reasonable to assume that 'there is a unique distribution of [aggregate *effective* demand] between different industries' (*G.T.* 282, emphasis added) so that a functional relation (the employment function) can be derived in equilibrium between the two scalar values of employment $N*$ and effective demand $D*$ (see Section **A1.3.1**). Keynes's use of the term *effective* demand when he might appear to mean *aggregate* demand is not accidental. ► **A5.3.4**

However, there is a further step, which Keynes does not here make explicit. The aggregate demand function $D_1 = D_1(N) = \chi(N)$ of *G.T.* Chapter 3 is a relation between expected proceeds and employment, and not a relation between income and expenditure. The treatment of income and expected proceeds (effective demand) as equivalent partly reflects their equivalence for factors of production; it also follows from Keynes's decision 'to omit express reference to short-term expectation' (*G.T.* 50) and to treat the effect on consumption of the disappointment of entrepreneur's expectations, as reflected in windfall losses, as a matter of practical importance but impossible to express by a mathematical function (*G.T.* 95–6).

The effective demand for consumption-goods refers to the expected value of the output of consumption-goods in production today; meaning the value expected, not today, but at the end of their production periods. There is no automatic equivalence of income and effective demand, which correspond respectively to the value of today's deliveries and the expected value of the

future deliveries in which today's employment will result. Today's aggregate demand for consumption-goods does not mean today's expenditure on goods by consumers; and today's income is not the same concept as today's effective demand.

Nevertheless, while effective demand represents the future income expected by entrepreneurs, its value includes factor income, which accrues as the factors are employed. The monetary nature of production is important, since factors must be credited with money-income at today's market prices as they deliver their services, quite independently of the future market value of their output. For the purpose of the propensity to consume, this is convenient, since it means that the bulk of the value of effective demand translates into immediate income, both for workers and rentiers. It is only entrepreneurs (or indeed, dealers) who must wait for future spot market prices to determine their income. If the state of expectation remains constant, income and effective demand will coincide for them too (although only over time as deliveries are made, and not on the same day); if the state of expectation changes today, entrepreneurs will make windfall gains or losses on work-in-progress (and other capital-goods), which may affect the propensity to consume today, irrespective of the date of delivery of the work-in-progress.

In the notes for his 1937 lectures Keynes writes:

Propensity to consume is determined solely by a psychological composite of actual and expected income and is determined neither by effective demand at a definite date nor by income at a definite date. Income, ie realised results as distinct from effective demand, only exists for entrepreneurs and for them is relevant only because it reacts on their subsequent determination of effective demand and on their personal consumption. Thus it was that I came to lay all stress on effective demand as operative factor … I found I could get all that was required by the conceptions of effective demand and income which were identical for factors but income of entrepreneurs at any time depended on outcome of prediction undertaken at various previous periods under influence of effective demand. (*C.W.* XIV, p. 180)

A3.3   INCOME, EFFECTIVE DEMAND AND THE MULTIPLIER

A3.3.1   The multiplier as a condition of market-period equilibrium

A marginal propensity to consume less than unity can be shown to be the macroeconomic equivalent of the Marshallian conditions of market-period equilibrium. The 'logical' multiplier corresponds directly to the existence of a 'market value for output as a whole [which] is, at the same time, a necessary condition for money-income to possess a definite value and a sufficient condition for the aggregate amount which saving individuals decide to save to be equal to the aggregate amount which investing individuals decide to invest' (*G.T.* 64).

This can be demonstrated in mathematical terms using the notation of Section **A1.3.1**, where:

Y aggregate value of income $\equiv \mathbf{y}'\mathbf{p}^s = (\mathbf{x} - \bar{\mathbf{x}})'\,\mathbf{p}^d$ in price equilibrium

C aggregate value of consumption $\equiv \mathbf{x}'_c\mathbf{p}^d_c = \mathbf{y}'_c\mathbf{p}^s_c$ in price equilibrium, where the subscript C denotes that the vectors include only the consumer goods industries

I aggregate value of current investment (exogenous)

The postulated functional relations are

$$\mathbf{x} = \mathbf{x}(\mathbf{p}^d, Y) \qquad (A3.1)$$
$$\mathbf{y} = \mathbf{y}(\mathbf{p}^s) \qquad (A3.2)$$
$$\mathbf{p}^d = \mathbf{p}^d(Y) \qquad (A3.3)$$
$$\mathbf{p}^s = \mathbf{p}^s(Y) \qquad (A3.4)$$

and without relative prices, the aggregate functions are

$$C = C(Y) \qquad (A3.5)$$
$$Y \equiv C + I \qquad (A3.6)$$

Note that the demand and supply functions (A3.1) and (A3.2) are those for the daily market period. Some variation in supply is possible, through the

depletion of stocks, the finishing of work-in-progress and the provision of services on demand, so that **y** need not be assumed constant. All variables are undated, i.e. simultaneous, so this is a static equilibrium problem.

The traditional (point) multiplier can be obtained by differentiating the national income identity (A3.6), giving

$$dY\!\big/\!dI = \frac{1}{1 - dC\!\big/\!dY} \tag{A3.7}$$

which for stability requires $dC\big/dY < 1$.

We can instead include the relative prices of consumer goods and write

$$Y \equiv C + I \equiv \mathbf{x_c'}\mathbf{p_c^d} + I \equiv \mathbf{y_c'}\mathbf{p_c^s} + I \tag{A3.8}$$

Dropping the subscript, the multiplier can now be written in two forms corresponding to demand and supply:

$$dY\!\big/\!dI = \frac{1}{1 - \left[\left(\dfrac{\partial \mathbf{x}}{\partial \mathbf{p^d}} \dfrac{d\mathbf{p^d}}{dY} + \dfrac{\partial \mathbf{x}}{\partial Y} \right)' \mathbf{p^d} + \mathbf{x}' \dfrac{d\mathbf{p^d}}{dY} \right]} \tag{A3.9}$$

$$dY\!\big/\!dI = \frac{1}{1 - \left[\left(\dfrac{d\mathbf{y}}{d\mathbf{p^s}} \dfrac{d\mathbf{p^s}}{dY} \right)' \mathbf{p^s} + \mathbf{y}' \dfrac{d\mathbf{p^s}}{dY} \right]} \tag{A3.10}$$

Note the extra term in the demand version (A3.9), reflecting the direct influence of aggregate income on demand independent of its influence through the demand price. In the case of supply, the quantity is determined solely by the supply price, which is thus the only channel through which aggregate income can affect supply.

The condition of market-period equilibrium is that expressions (A3.9) and (A3.10) for the multiplier are equal. In each industry this means (abstracting from complementarity between industries)

$$\left(x + p^d \frac{\partial x}{\partial p^d} \right) \frac{dp^d}{dY} + p^d \frac{\partial x}{\partial Y} = \left(y + p^s \frac{dy}{dp^s} \right) \frac{dp^s}{dY} \qquad (\text{A3.11})$$

In equilibrium $x = y$, $p^s = p^d$ so we can write:

$$\left[\frac{dp^d}{dY} \frac{Y}{p^d} + \frac{\partial x}{\partial p^d} \frac{p^d}{x} \frac{dp^d}{dY} \frac{Y}{p^d} + \frac{\partial x}{\partial Y} \frac{Y}{x} \right] \frac{p^d x}{Y} = \left[\frac{dp^s}{dY} \frac{Y}{p^s} + \frac{dy}{dp^s} \frac{p^s}{y} \frac{dp^s}{dY} \frac{Y}{p^s} \right] \frac{p^s y}{Y} \quad (\text{A3.12})$$

which can be restated as

$$\varepsilon_{p^d Y} \left(1 + \varepsilon_{xp^d} \right) + \varepsilon_{xY} = \varepsilon_{p^s Y} \left(1 + \varepsilon_{yp^s} \right) \qquad (\text{A3.13})$$

where ε_{xY} denotes the aggregate income elasticity of demand

$$\frac{\partial x}{\partial Y} \frac{Y}{x},$$

$\varepsilon_{p^s Y}$ the aggregate income elasticity of the supply price

$$\frac{dp^s}{dY} \frac{Y}{p^s}$$

and the other elasticities are written accordingly.

For normal goods, $\varepsilon_{xY} > 0$, so that

$$\frac{\left(1 + \varepsilon_{xp^d} \right)}{\left(1 + \varepsilon_{yp^s} \right)} < \frac{\varepsilon_{p^s Y}}{\varepsilon_{p^d Y}} \quad \text{and therefore } \varepsilon_{xp^d} < \varepsilon_{yp^s} \text{, if } \varepsilon_{p^s Y} \leq \varepsilon_{p^d Y} \quad (\text{A3.14})$$

Putting (A3.14) into words, the condition for aggregate money-income to be defined is equivalent to the standard Marshallian condition that in each industry the market-period price elasticity of demand is less than the market-period price elasticity of supply for normal goods, provided that the aggregate income elasticity of the supply price is less than or equal to the aggregate income elasticity of the demand price. The latter pair of 'aggregate' elasticities do not appear explicitly in Marshall.

In the market period, the price elasticity of demand is negative for normal goods, and the price elasticity of supply is either zero, or positive mainly through the depletion of stocks. *A priori* one would expect the second half of the condition to hold as an inequality for normal goods below full employment, and the strict equality to hold at full employment. The definition of a normal good is that the quantity consumed increases with total consumption. Although all supply prices will increase as aggregate output increases, through diminishing returns in market-period production and increasing demand for a given quantity of capital-goods, an increase in the quantity consumed implies that the demand price increases with aggregate income by more than the supply price. Only at full employment, when no increase in the quantity produced is possible except by substitution of other goods, can one expect supply prices to increase *pari passu* with aggregate income and demand prices.

It is interesting to compare this approach to that of Samuelson (1947, pp. 278–80) who reaches a similar conclusion that a marginal propensity to consume less than unity is a stability condition, but based on a completely different principle. Samuelson specifies 'the rate of change of income as proportional to the difference between intended savings-investment and actual savings-investment' (ibid., 278).

A3.3.2 Hansen's versions of the multiplier

The three versions of the multiplier referred to in this chapter can be written, using the notation of Sections **A1.3.1** and **A2.2.2**, as follows:

logical, instantaneous
$$\frac{1}{1 - dC/dY} \tag{A3.15}$$

logical, over discrete time
$$\frac{Y_t - Y_{t-j}}{I_t - I_{t-j}} \tag{A3.16}$$

normal
$$\frac{D^{**}|\Omega',r' - D^{**}|\Omega,r}{I^{**}|\Omega',r' - I^{**}|\Omega,r} \tag{A3.17}$$

Expression (A3.15) is the familiar result of differentiating the income identity $Y \equiv C + I$. Expression (A3.16) expresses the ratio of the difference between *income* on any two days separated by an interval *j* (irrespective of any

changes in the state of expectation) and the corresponding difference in current investment. This is the observable discrete form of the multiplier, which is equivalent to (A3.15) if the propensity to consume is stable over time and linear, giving a constant marginal propensity to consume. The numerator of expression (A3.17) is the difference in the values of long-period aggregate *effective demand* corresponding to two states of long-term expectation Ω and Ω' and their corresponding interest rates, while the denominator is the corresponding difference in the values of long-period effective demand for current investment. D^{**} is the aggregate effective demand associated with the long-period employment $n^{**}|\Omega, r$, and I^{**} the related effective demand for capital-goods. Expression (A3.17) represents the normal value of the multiplier (*G.T.* 123, 125); all three are exercises in comparative statics, since both income and long-period effective demand are equilibrium values. In a steady state, the values of expressions (A3.16) and (A3.17) will coincide, even though one refers to income and the other to effective demand.

Hansen's interpretation of the multiplier (and of Keynes's use of it) is rooted in the idea that the multiplier establishes equilibrium between *ex ante* and *ex post* consumption at the point of effective demand. This represents a quite different account of the nature of effective demand from the present one. The definition of the multiplier in expressions (A3.15) and (A3.16) is regarded by Hansen as a 'mere *arithmetic* multiplier (i.e. a truism) and not a true *behaviour* multiplier based on a *behaviour* pattern which establishes a verifiable relation between consumption and income' (1953, p. 111, original emphasis), a tautology devoid of behavioural content. In reaching this conclusion, he neglects the behaviour represented by the competitive process of determination of prices in individual markets. Instead he invokes a 'definite expenditure-lag behaviour pattern' (1953, p. 112), but presents no microeconomic explanation of this pattern in terms of the competitive equilibrium of supply and demand.

Hansen distinguishes between a 'moving equilibrium' and a 'period analysis' multiplier (1953, p. 108). He links Keynes's 'logical multiplier' to his own 'moving equilibrium' and relates both to the case where 'a change in aggregate investment … has been foreseen sufficiently in advance for the consumption industries to advance *pari passu* with the capital-goods industries without more disturbance to the price of consumption-goods than is consequential, in conditions of decreasing returns, on an increase in the quantity which is produced' (*G.T.* 122). On the present account this quotation refers, not to the logical multiplier, but to expression (A3.17), which represents not only a comparison between two positions of static long-period

equilibrium, but also an implicit convergence path of employment between the two positions where sufficient notice of change is given (Section **A2.2.3**). Expression (A3.17) provides the behavioural relation sought by Hansen. On the present reading, Keynes's logical multiplier has nothing to do with normal behaviour as Hansen suggests, but relates simply to the change in the (equilibrium) values of income and investment over any period of time, no less behavioural for not being 'normal'. Hansen's 'moving equilibrium' relates to an equilibrium of *ex ante* and *ex post* (1953, p. 59) which is absent from *The General Theory*.

Hansen's second concept of the multiplier in terms of 'period analysis' involves time-lags and the unforeseen change in investment of section IV of *G.T.* Chapter 10. Our account has no room for an unexplained expenditure-lag, but there is a difference between the convergence path of employment in a case where the change in the state of expectation has been wholly foreseen, and where it is wholly or partly unforeseen. As already described in Section **A2.2.3**, a change in the state of expectation will, in the latter case, affect the value of work-in-progress and stocks of finished consumption-goods, so that Keynes's Marshallian 'temporary equilibrium' will be struck so as to clear the markets for consumption-goods at prices above the normal supply prices, until such time as production can increase to eliminate the temporary scarcity. The variations in the multiplier during this process are captured by expression (A3.16).

NOTE

1.   It is this inexact correspondence to which 'Okun's Law' refers (Mankiw, 2003, pp. 35–6).

4.   The Inducement to Invest

This chapter corresponds to *G.T.* Book IV, with the exception of *G.T.* Chapter 18 (Keynes's summary chapter), which is taken here under Chapter 5. Having considered consumption and its relation to income and current investment in *G.T.* Book III, Keynes now turns to address the determinants of the aggregate demand for new capital-goods, which in his initial exposition of the Principle in *G.T.* Chapter 3 he presented as exogenous. *G.T.* Book IV (*G.T.* Chapters 11–17) takes us from the short-term world of *G.T.* Books II and III, where expectations can usually reliably be based upon present results, into the world of decisions about the long-term future, where no such assurance can be given. *G.T.* Book IV demonstrates how 'changing views about the future are capable of influencing the quantity of employment' (*G.T.* xxii) by the use of two analytical tools, the schedules of the marginal efficiency of capital and of liquidity-preference, to connect changes in the rate of current investment with changes in the state of long-term expectation.

The marginal efficiency of capital (*G.T.* Chapter 11) has an affinity with user cost through their shared dependence on the state of long-term expectation (*G.T.* Chapter 12), and these complementary concepts reflect the two aspects of capital-goods, as instruments of production and as stores of value. ► **A4.2.1** The marginal efficiency of capital draws an analytical line between long-term debts and capital-goods as stores of value, while the preference for liquidity, in the face of the uncertainty of the state of long-term expectation, draws a similar line between money and long-term debts. Keynes's own theory of the rate of interest is developed in *G.T.* Chapters 13 and 15, while *G.T.* Chapter 16 on the nature of capital explains the deliberate choice of 'efficiency' over 'productivity'. *G.T.* Chapter 14 applies the method of *reductio ad absurdum* to the Classical theory of interest, very much as does *G.T.* Chapter 2 to the Classical theory of employment.

This chapter emphasises that liquidity-preference is derived from the state of long-term expectation and is relevant to all kinds of capital-asset, in contrast with the more usual treatment, limiting liquidity-preference to the theory of the rate of interest. Thus the chapter reverses Keynes's order of approach, starting with ideas expressed in their most general form in *G.T.*

Chapter 17, and working towards their more concrete expression in the investment-demand and liquidity-preference functions. The core proposition is that the demand for capital-goods is a function both of the actual state of long-term expectation (expressed through the marginal efficiency of capital) and of the uncertain prospect of indefinite change in that state (expressed through liquidity-preference).

4.1 A HIERARCHY OF LIQUIDITY

One of the axioms of Classical economics is 'gross substitution', meaning that under perfect competition every good or service is, to some degree and at the right price, a substitute for every other, either directly in exchange or indirectly through production. In *The General Theory*, by contrast, goods and services are divided up into the categories of money (including some short-term debts), bonds (long-term debts), labour, natural resources, consumption-goods, and capital-goods. Keynes's rate of interest is the differential between the interest rates on long-term (bond) and short-term (money) debts, in both cases the secure liabilities of either the banking system or the State. Apart from money and labour, these categories do not represent homogeneous aggregates and the classification does not imply any assumption of particular relative prices of natural resources, bonds, consumption-goods and capital-assets, within and between their categories. The three partitions between four of these categories correspond to Keynes's macroeconomic functions, the propensity to consume and the schedules of the marginal efficiency of capital and of liquidity-preference, which do not replace but complement Marshall's microeconomic supply and demand functions. The compartments can be illustrated as follows, where each class of goods is a separate compartment, although the three categories of asset also share a larger compartment:
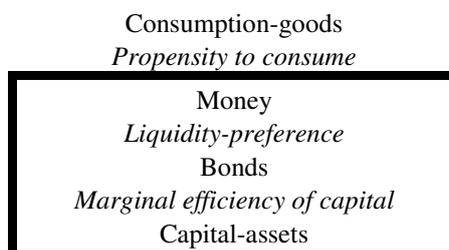
Consumption-goods
Propensity to consume
Money
Liquidity-preference
Bonds
Marginal efficiency of capital
Capital-assets

Figure 4.1 Keynes's compartmentalisation of goods

Thus the propensity to consume determines the level of consumption and aggregate income for a given level of current investment, which in turn changes the stock of wealth held in the form of capital-assets. For the individual, if not for the community as a whole (leaving aside commodity money and foreign lending), money and bonds represent alternative forms in which wealth can be held. Labour and natural resources do not appear explicitly in the diagram but are either consumed directly or employed in the production of consumption-goods or capital-assets. There is a causal sequence (down the page) so that an individual takes two steps: the decision to consume income or wealth; and the decision as to the form in which to hold wealth, old and new. The causal sequence also operates, as we shall see, within the 'wealth box', so that money dominates bonds, and bonds dominate capital-assets.

It is of the greatest importance to realise that in *The General Theory* individuals do not choose between (say) consumption-goods on the one hand and bonds or capital-assets on the other (Fisher and Hicks); nor between money and consumption-goods (Pigou and Friedman), or money and capital-assets (Minsky); nor do employers as a whole substitute between labour and capital-goods in choosing how to produce a given output (the Classical aggregate production function). Each of these missing choices has played a role in the interpretative controversy, but they are ruled out by Keynes's treatment of time. The common foundation of Keynes's three macroeconomic functions and his system of classification is our uncertainty about the future, and it is this which interferes with the 'gross substitution' of Classical theory.

These compartments have nothing to do with obstacles to competition. In *G.T.* Chapter 17, Keynes assumes that the price of each asset is held under perfect competition at the equilibrium point where the net advantage or total prospective return from holding any asset is the same (*G.T.* 227–8). Our discussion of the multiplier in Chapter 3 of this book has made it clear that the balance between consumption and current investment may be affected by movements in relative prices, and that a marginal propensity to consume less than unity is in fact a condition of temporary market-period equilibrium and the existence of a market value for output (i.e. income) under perfect competition. The compartments are not about imperfect competition or *ad hoc* behavioural restrictions, but about the propensity to consume today when the future is unknown, and about differences in the effect of changing views about the future on each class of asset.

With regard to the propensity to consume, the Classical theory holds that the rate of interest (in some 'real' sense) regulates the division of income

between consumption and saving/investment, balancing the preference for consumption today against the greater consumption tomorrow arising from the 'productivity' of capital. There is thus no partition between consumption and investment as in *The General Theory*, but an optimum equilibrium allocation of consumption over time based on relative prices. Keynes's critique of the Classical theory of interest begins in *G.T.* Chapters 6 and 7 with the definition of income as the value of output and the investment-saving identity, and Chapter 2 of this book has explained why the familiar Old Keynesian concepts of equilibrium income and the equilibrium of *ex ante* and *ex post* saving, reminiscent of the Classical approach, were rejected by Keynes. The prices and outputs of consumption- and capital-goods are always in competitive equilibrium, provided that output has a market value, and there is nothing left for the rate of interest or the quantity of money to do in bringing about equilibrium between these two aggregates. *G.T.* Chapter 14 approaches the same question from a different angle, emphasising that the investment and saving schedules implicit in contemporary Classical thought are not independent of each other or of money-income.

Keynes's partition between consumption and investment, embodied in the propensity to consume, is not an endogenous outcome but an independent variable of his equilibrium theory of employment. *G.T.* Chapter 9 succinctly summarises the complex long-term subjective influences on the propensity to consume, most of which are not amenable to equilibrium analysis and depend greatly on psychological attitudes towards the future. Certainly the propensity to consume bears no simple functional relation to the rate of interest in the short term, and as for the long term, Keynes is agnostic. On the one hand, he acknowledges that a fall in the rate of interest may increase the propensity to consume (*G.T.* 218); but on the other, he regards it as likely that the accumulation of wealth reduces the propensity to consume (*G.T.* 31, 97). He is quite clear that competition alone provides no 'self-regulatory process of adjustment which takes place without the necessity for any special intervention or grandmotherly care on the part of the monetary authority' (*G.T.* 177).

In moving from the consideration of consumption decisions to investment, Keynes's choice of compartments and partitions within the 'wealth box' is pregnant. He accepts that the total prospective return from holding any asset, new or old, is equalised under perfect competition, and without the compartments, he would have no basis for causal analysis, in particular for picking out the money rate of interest as the significant variable. If there were an asset other than money whose total prospective return (whether measured in terms of money or itself does not matter) were fixed exogenously, the total

prospective return from all other assets, including money, would also be held at the same level in equilibrium. If the money rate of interest were below this level, holders of bonds would be better off selling and buying other assets, thus reducing the price of bonds and raising the money rate of interest. In such a case, the causal analysis would need to explain why the prospective return on the 'dominant asset' should be exogenous and impervious to the forces of competition and substitution.

The question, therefore, is how do market forces operate to determine the total prospective return on all types of asset? The sophisticated Classical answer (avoiding the attribution of physical productivity to some homogeneous measure of capital), as set out by Marshall and accepted by Keynes, is that the prospective return on capital-assets in general reflects their relative scarcity in exactly the same way as the return on land and other natural resources in more or less fixed supply. The scarcity of producible capital-assets can in principle be eliminated by increasing their supply, hence Marshall's distinction between their 'quasi-rents' and the true rents of land, etc. Where Keynes and the Classics part company is that the latter invoke the notion of 'waiting' (Pigou adds 'uncertainty-bearing', an interesting half-way house between Marshall and Keynes, 1932, p. 771) as the independent element of 'capital in general' which is in scarce supply. Since output is determined by full employment in this Classical system, capital-assets can be accumulated only if people are willing to postpone consumption in favour of investment, and because they are reluctant to do so without the inducement of a real rate of return, capital-assets remain scarce and continue to earn quasi-rents (see the quotation from Marshall at *G.T.* 242).

Since 'waiting' is 'not consuming', Keynes's identification of the investment-saving identity and its direction of causation (that current investment determines saving) deprives the increment of waiting of any independent causal influence upon the rate of investment and therefore the scarcity of capital-assets. So, if it is not the reluctance to wait, what is it that keeps capital-assets scarce and their total return above zero? Keynes's answer is ultimately the same as that of Aristotle and St Thomas Aquinas, that the love of money is the root of all evil (*G.T.* 351–2), although this phrase needs considerable elaboration and clarification. There is something about money which makes the money rate of interest fall more slowly than the total prospective returns on other assets as they accumulate. This 'something' turns out to be related to the changing views about the future to which a monetary economy is sensitive (*G.T.* xxii), and which he formalises as changes in the state of long-term expectation. Furthermore, this 'something' attaches more strongly to money than to bonds, and to bonds more than to

real capital-assets, so that on this dimension bonds are always preferred to real capital-assets, and money is always preferred to bonds. We thus arrive at Keynes's three categories of asset and the two partitions between them, the marginal efficiency of capital and the state of liquidity-preference.

Keynes's objective is to establish a relation between investment and the state of long-term expectation, through the combined mechanism of the functional schedules of the marginal efficiency of capital and of liquidity-preference. The state of long-term expectation cannot itself be captured by a quantitative variable that can be put directly into a function, unlike the rates of interest and of current investment and the quantity of money, yet it is the substrate of the two asset functions themselves. The action in Keynes's system comes, not primarily through movements 'along the curves' caused by changes in the quantity of money, but through shifts in the state of long-term expectation and the related state of liquidity-preference, and in the corresponding functions and positions of equilibrium. His technical achievement is to incorporate something as elusive as changing views about the future into a formal equilibrium framework.

The reason why two functions are necessary emerges in *G.T.* Chapter 17 of which, astonishingly, Hansen writes 'not much would have been lost if it had never been written' (1953, p. 159). The total prospective return can be divided between prospective yield (q), carrying costs (c), and liquidity-premium (l), all measured in terms of the asset in question, so that total prospective return in terms of money equals $a + q - c + l$, where a is the expected appreciation in the money price of the asset. Keynes then divides assets into two groups, one comprising real assets and bonds which offer a return in the form of a prospective money yield less carrying costs ($a + q - c$), and money as the other, offering a return in the form of a liquidity-premium (l). This segregation is a simplification, since Keynes allows that real assets and bonds may offer some liquidity, and that money may offer some prospective yield (when in the form of bank deposits or treasury bills) and incur carrying costs (for safe custody). The prospective yield, carrying costs and liquidity-premium are thus to be understood as defined net, relative to the corresponding forms of return, on money or other assets respectively. Furthermore, for reasons that will become clear, bonds always have a higher (gross) liquidity-premium than real assets, so that liquidity-preference can properly be discussed in terms of the choice between money and bonds alone.

The purpose of this segregation of money from other assets is to isolate the liquidity-premium on money as the rate which 'rules the roost' and holds up the rate of return on capital-assets in general. Keynes's argument requires that he identifies separately the essential properties of money as distinct from

other assets, and connects these to the rate of current investment in capital-assets which, unlike money and bonds, can be produced by labour. This is achieved by the separate definition of the two functions, of liquidity-preference and of the marginal efficiency of capital, a distinction which is absent or at least of no causal significance in Classical theory.

Keynes's choice of compartments and of the partitions between them is far from arbitrary, and the lack of substitutability between each compartment, except through the partitioning functions, has nothing to do with obstacles to competition. The Classical axiom of gross substitution, which would dissolve the partitions between the compartments, abstracts from the uncertainty about the future which is the common foundation of Keynes's three macroeconomic functions.

4.2   STOCKS AND FLOWS

The investment-saving identity and Keynes's use of time and equilibrium periods are important to a full appreciation of his two asset functions, of the marginal efficiency of capital and liquidity-preference. In particular, these elements of Keynes's thought shed light on two major interpretative controversies, over the logical consistency of Keynes's use of the marginal efficiency of capital, and over the relationship between Keynes's liquidity-preference and the neo-classical loanable funds theories of the rate of interest.

The difficulty over the marginal efficiency of capital arises from Keynes's statement that the schedule of the marginal efficiency of capital or investment-demand schedule has a downward slope (*G.T.* 136). Critics such as Eatwell (1983) have taken this as evidence that Keynes's marginal efficiency of capital is in fact nothing more than the Classical marginal (revenue) 'productivity' of capital, and indeed Keynes appears to confirm this in his subsequent statement that '[There is no] material difference, relevant in this context, between my schedule of the marginal efficiency of capital or investment-demand schedule and the demand curve for capital contemplated by some of the classical writers who have been quoted above' (*G.T.* 178), where these writers include none other than Walras (*G.T.* 177). Since the Classical theory is based on full employment, there appears to be logical inconsistency in using the marginal efficiency of capital to determine a position of under-employment equilibrium.

The controversy dissolves if the argument of Chapter 1 of this book is accepted, that Keynes's theory of employment is, within the quantum limits of the 'daily' unit of time, one of continuous short-period equilibrium at any

time. By recognising Keynes's distinctions between *period* and *term*, we can identify three versions of his investment-demand schedule in different contexts, for the short period, for the short-term long period, and for the long term. Only the third requires the assumption of full employment, as a result of intervention by the authorities (*G.T.* 220), and is used in that context only, not as a description of unaided market outcomes.

Full employment is a sufficient, but not a necessary, condition for a downward slope in the investment-demand schedule; all that is *necessary* is a constant state of long-term expectation, in which the conditions of demand for the output derived from any given type of asset are taken as given.[1] Given inelastic demand, increased supply will reduce the expected market price, or if demand is elastic, the marginal efficiency of capital will reduce as the supply price of the capital-good rises, as more is produced under diminishing returns. The state of expectation may always be treated as constant at a point in time, even if it changes from day to day. Furthermore, as discussed in Chapter 2 of this book, Keynes is ready to admit, at least in theory, that the state of expectation may be constant in the short *term*, allowing employment to reach a corresponding long-period position as the aggregate capital equipment adjusts to the given state of expectation. However, the changing and unpredictable nature of the state of long-term expectation beyond the short term, if not necessarily from day to day, is part of the non-negotiable core of *The General Theory*.

Given the perspective that Keynes's daily short period is instantaneous, there is no significance in Keynes's use of the term 'marginal efficiency of capital' rather than 'marginal efficiency of investment' (the stock/flow distinction, Lerner, 1952), and Keynes's separation of the demand and supply effects of new investment is legitimate. Today's investment represents the production of new capital-goods, which are not themselves available for use in production, but add to the stock of capital equipment upon which tomorrow's effective demand will be based. On any given day, production of new capital-goods will be limited mainly by diminishing returns in production with the existing capital equipment, so that price equilibrium is achieved by an increase in supply price; although to the extent that capital-goods are produced in order to be held as a store of value rather than for use in production, price equilibrium may be reached partly through a rise in carrying costs (*G.T.* 233–4) and the corresponding reduction in the net prospective yield ($a + q - c$). Together these factors give a 'short-period schedule' of the marginal efficiency of capital, based solely on today's state of expectation, which may change tomorrow, and not upon the constant state

of expectation necessarily associated with the full employment of the Classical investment-demand schedule.

If the state of expectation remains constant for the duration of the period of production that defines the short term and the length of Keynes's long period, the prospective yield of assets, which were initially in short supply as a result of a previous change in the state of expectation (e.g. shortages of particular components or machines), falls over the long period with an increase in their availability, without any implication that this represents substitution of capital for labour or other factors at the Classical margin of full employment. The marginal efficiency of each type of capital-asset falls in turn more slowly than the prospective yield, since its supply price falls as the rate of investment reduces and the supply curve of this type of capital-asset itself shifts as capital accumulates. The diminishing returns of this 'long-period schedule' reflect the increase in capital equipment relative to the constant state of long-term expectation, rather than relative to the availability of other factors of production.

By further contrast, *G.T.* Chapter 16 considers the case where the period of time is long enough for the marginal efficiency of capital to reach zero in a 'quasi-stationary' state (*G.T.* 220) leading to 'the euthanasia of the rentier' (*G.T.* 376). This 'long-term schedule' of the marginal efficiency of capital depends not only on a constant state of long-term expectation, but explicitly upon the maintenance of full employment by government intervention. The downward slope of the schedule here corresponds exactly to the Classical full-employment investment-demand schedule based on factor substitution.

G.T. Chapter 17 also takes as its hypothetical benchmark this 'long-term schedule' and the position of full employment and capital satiation to which, Keynes accepts, perfect competition would move the system in the absence of 'money-ness' (*G.T.* 235). Yet given less than full employment and a positive marginal efficiency of capital on any day, he returns to the short period when he states the problem as the decline of the rate of interest 'more slowly, as output increases' than the marginal efficiency of capital-assets (*G.T.* 236, note misprint in *C.W.* VII). The reference to output rather than capital equipment means that Keynes here refers to investment (the flow), not capital equipment (the stock), and to the 'short-period investment-demand schedule' for a given day in a given state of expectation. The 'short-period schedule' depends only on the state of expectation on any given day, as does employment as a whole, and not upon the assumption of full employment. The short-period obstacle to investment means we never reach the Classical long-term long-period equilibrium position.