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Lectures on John Maynard Keynes' *General Theory of Employment, Interest and Money* (5)

Chapter 6, "The Definition of Income, Saving and Investment"

Appendix to Chapter 6, "Appendix on User Cost"

Chapter 7, "The Meaning of Saving and Investment Further Considered"

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Appendix to Chapter 6, "Appendix on User Cost"; Chapter 7, "The
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Abstract

Chapter Six and its Appendix deal in some detail with the way Keynes is defining income, savings and investment in the *General Theory* while the appendix to Chapter 6 goes into detail on user cost. His concept of user cost at one point sparked a certain amount of controversy among Keynesians but has since virtually been forgotten. It is of interest to us because user cost is the place where Keynes sees firms taking account of the future consequences of their current production decisions. The *General Theory* is a theory of the short run, but firms' cost curves, which are key to many short run decisions, contain a forward looking element. Chapter 7 returns to the concepts of saving and investment, relates Keynes' definitions to those used by others (including his own from the *Treatise*) and relates aggregate investment, which refers to additions to physical capital stock, to the way the term is often used at the micro level, in the sense of investment in financial assets.

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Lectures on John Maynard Keynes' *General Theory* (5):

Chapter 6: "The Definition of Income, Saving and Investment"

Introduction:

Chapters Six and Seven of the *General Theory* ultimately deal with the issue of the relation between savings and investment, but build up to it through the development of Keynes' particular definitions of aggregate variables. A word of warning: this is the chapter which Hayek was talking about when he said at one point that he'd given up reading the *General Theory* because he'd gotten so bogged down in Keynes' definitions¹ of income. This material harks back to Chapter 3, where Keynes defined factor cost as the amounts an employer pays out to factors of production for their current services, user cost as the cost he incurs as a result of using capital rather than keeping it idle, plus the value of what our entrepreneur pays for items purchased from other entrepreneurs, and proceeds as revenue net of user cost – proceeds being the measure of the value added by this firm, used in calculating GDP by the value added measure. The entrepreneur's profit is the excess of his revenue over the sum of his factor cost and user cost.

Chapter 6 begins with an elaboration on these definitions. Keynes denotes by A the value of the finished output which one entrepreneur has sold either to consumers or to other entrepreneurs, and by A_1 the amount he spent on buying finished output from other entrepreneurs, so that A_1 could include fixed capital or intermediate inputs. He then says that the entrepreneur "will end up with a capital equipment, which term includes both his stocks of unfinished goods or working capital and his stocks of finished goods, having a value G ." This then gives us what is basically the value of the firm at the end of the period: $A + G - A_1$. Here " G " is essentially what he could sell his capital, fixed and working, for at the end of the period. Note that while Keynes is subtracting A_1 from the value that the entrepreneur has at the end of the period, he is not

¹ See Susan Howson (2009): "Keynes and the LSE Economists" *Journal of the History of Economic Thought* 31(3), 257-280 Hayek did eventually finish reading the *GT*. Susan Howson (2001): "Why didn't Hayek Review Keynes General Theory? A Partial Answer" *History of Political Economy* 33 (Summer) 369-374

subtracting factor cost, F , so we are still working in value added terms, with our firm's factor costs to be paid out of its value added. This isn't the end point of the calculation, though, since we haven't yet included the part of user cost which relates to his actually having used his capital to earn A . We haven't, in short, completed the calculation of proceeds.

The extra bit of user cost which has to be added in is essentially an opportunity cost measure. Keynes next notes that G , the market value of the firm's end-of-period capital is a net value term: the entrepreneur has by the simple fact of having used his capital through the period reduced its value relative to the value it held at the beginning of the period, but through that period he has also spent a certain amount on maintaining it, presumably with the result that the market value of his capital at the end of the period is greater than it would have been had he not spent anything on maintenance, even after we subtract that maintenance expenditure from the market value of the capital. In other words the market value of the capital minus the maintenance expenditure is presumably greater than the market value the capital would have had had nothing been spent on its maintenance. Hence G is the net value of the capital at the end of the period.

To calculate the user cost, we have to note that the firm had, at the beginning of the period, an alternative possible strategy with regard to the value of its capital equipment: it could have shut down production, so as not to reduce the value of the capital through use, and spent a certain amount on protecting and improving it, with an eye to selling it at the end of the period. The entrepreneur is basically in the position of someone who has bought an antique car: he can either drive it to car shows, spending whatever was necessary for maintenance but inevitably reducing its value through wear, or he could put it in a showroom, so there was no wear, and spend on protecting and improving its value. If he chooses not to use the capital, at the end of the period he will have capital with a gross value of G' on which he will have spent an amount B' , so that $[G' - B']$ is the net value to be compared with the net (as defined) value G . In other words, the counterpart of B' has already been subtracted from G . Then the opportunity cost of using the capital is $[G' - B'] - G$, which is the reduction in the value of his capital relative to the maximum

possible (net) value it could have had at the end of the period had it not been used to produce revenue A. Then the user cost of producing A is defined² as

$$U = [G' - B'] - G + A_1$$

It's important to note that the user cost of capital is tied directly to its being used in the production of output: it is depreciation in the sense that it is a reduction in the value of capital, but it is not depreciation which follows simply from the passage of time. Keynes gets into that issue a bit further into Chapter 6.

Factor cost, F and User cost, U, add up to give what Keynes (and his contemporaries³) called prime cost and what we would call variable cost – cost which varies directly with the level of output produced. He then defines the entrepreneur's Gross Profit, Π , as the excess of A over F + U:

$$\Pi = A - F - U$$

Gross profit, Π , is what the firm is aiming to maximize as a result of hiring other factors of production.

From this we also get a relation between incomes and proceeds, since proceeds can now be defined as A – U:

$$\Pi + F = A - U$$

So far, Keynes has been working at the level of the individual firm, but these definitions are the basis for his aggregate level, value added, definitions. For the individual firm, $A - A_1$ is the difference between what the firm earns as revenue from selling its own products and what it pays out in buying the products of other firms. If the firm we're looking at happens to be one which

² In Chapter 6 Keynes actually writes this as $[G' - B'] - [G - A_1]$. The version we give is the version he used in the appendix to Chapter 6, and seems more intuitive.

³ See, for example a note by Nicholas Kaldor and Joan Robinson, originally written in 1941 published in the academic literature in 2000: "Note on alternative hypotheses as to the determination of Profit Margins" Review of Political Economy 12(3), 2000, and the explanatory note that introduces it: J.E. King (2000): "Introduction to an Unpublished Note by Nicholas Kaldor & Joan Robinson" Review of Political Economy 12(3) 2000. The only paper co-authored by Kaldor and Joan Robinson, writing it apparently put a strain on their relationship. They eventually parted ways completely (see J. E. King (1998): "'Your Position is Thoroughly Orthodox and Entirely Wrong': Nicholas Kaldor and Joan Robinson, 1938-1983" Journal of the History of Economic Thought 20(4), 411- 432).

produces capital goods for sale to other firms, its “A” will be some other firm’s A_1 , so the whole of that firm’s $A - A_1$ would represent transactions between firms. When we add across firms, though, getting what Keynes writes as $\sum[A - A_1]$, items which show up as A for some firms and as A_1 for others will cancel out, and in the aggregate what we will have is the total of all sales revenue minus the value of sales between firms, and since sales between firms are sales (and purchases) of capital goods, $\sum[A - A_1]$ represents aggregate consumption – the value of sales to someone other than other firms. Note that this will include sales to government and export sales: Keynes isn’t subdividing the elements of national income and expenditure the way we do today.

The next aggregate expression Keynes introduces is $\sum[A_1 - U]$, which is a bit more straightforward: A_1 is the value of goods bought from other firms, which are defined to be capital goods, and U is the user cost of using capital, so this expression is investment (I)⁴.

Given these definitions, Keynes returns to the definitions of the aggregate demand and supply functions from Chapter 3: the aggregate demand function shows the aggregate demand price, which he defines as the level of proceeds which entrepreneurs in the aggregate expect will follow from various aggregate levels of employment, while the aggregate supply function shows the aggregate supply price, the aggregate level of proceeds which would just be sufficient to persuade firms in the aggregate to employ various aggregate levels of employment. The level of effective demand is the point of intersection between the aggregate demand and aggregate supply functions, and gives the level of employment at which the system will settle.

The abominable footnote:

Keynes then goes on to introduce the infamous footnote⁵ on page 55. Infamous, because it has spawned a literature of its own, with myriad different interpretations of what Keynes really

⁴ Note that U includes A_1 , so this is also $-[G' - B'] - G$.

⁵ Also referred to as the Abominable footnote: See, for example, G. M. Ambrosi (2011) “Keynes’ abominable Z footnote” Cambridge Journal of Economics 35(3) 619-633

meant by it. The exegesis is complicated by the presence of what's commonly referred to⁶ as “Keynes’ slip of the pen” at the end of the footnote.

The text to which the footnote is attached reads:

This set of definitions also has the advantage that we can equate the marginal proceeds (or income) to the marginal factor cost; and thus arrive at the same sort of propositions relating marginal proceeds thus defined to marginal factor costs as have been stated by those economists who, by ignoring user cost or assuming it to be zero, have equated supply price¹ to marginal factor cost².

There are actually two footnotes attached to this passage, both of which have some controversy attached to them. The first, on “supply price” ties in to the appendix to chapter 6, so we will leave it until we reach that point. It is the second, on “marginal factor cost” which points to the infamous footnote, which reads:

For example, let us take $Z_w = \phi(N)$, or alternatively $Z = W \cdot \phi(N)$ as the aggregate supply function (where W is the wage-unit and $W \cdot Z_w = Z$). Then, since the proceeds of the marginal product is equal to the marginal factor-cost at every point on the aggregate supply curve, we have

$$\Delta N = \Delta A_w - \Delta U_w = \Delta Z_w = \Delta \phi(N),$$

that is to say $\phi'(N) = 1$; provided that factor cost bears a constant ratio to wage-cost, and that the aggregate supply function for each firm (the number of which is assumed to be constant) is independent of the number of men employed in other industries, so that the terms of the above equation, which hold good for each individual entrepreneur, can be summed for the entrepreneurs as a whole. This means that, if wages are constant and other factor costs are a constant proportion of the wages-bill, the aggregate supply function is linear with a slope given by the reciprocal of the money-wage.

Part of the problem with the interpretation of the footnote arises from overlooking that what Keynes is doing here is establishing a parallel between his aggregate supply price curve and the conventional supply price curve of the Marshallian analysis of the individual firm. Throughout the *General Theory*, Keynes is at pains to anchor his aggregate analysis in Marshallian micro theory. There is also a tendency among some analysts to try to interpret the footnote as referring

⁶ See Claudia Heller (2009): [Keynes’s slip of the pen: aggregate supply curve vs employment function](#) Munich Personal RePEc Archive, MPRA Paper No. 12837, January

to the point of effective demand – the point of intersection between aggregate demand and aggregate supply functions, or the equilibrium, or profit maximizing, point. The supply price curve for the individual firm shows the prices which, for each level of output, would be just sufficient to induce the profit maximizing competitive firm to produce that level of output.

For the individual firm, the supply price curve is the same as the marginal cost curve, interpreted as showing the increase in cost which would have to be covered were the firm to increase its output by one unit. This means that, for each level of output, the supply price of the last unit of output is the marginal cost of that unit of output. When we read supply price off the marginal cost curve, in other words, we are sliding along the MC curve.

It is easy to lose sight of that last point and misinterpret the fact that the supply price of the last unit of the total level of output is the supply price of the output as a whole. This proposition is true in the sense that, were the firm to be offered a slightly lower price it would not produce the same total level of output – it would produce slightly less. If, however, it is paid a price per unit equal to the marginal cost of the last unit, as it will be in a competitive market, it will be getting more per unit than the supply price of all of the units before the marginal one. In other words, a total amount equal to the marginal cost of the marginal unit multiplied by the total quantity of output demarcated by that unit, will involve the firm receiving producer surplus on intervening units. If the supply price is to rise by an amount just sufficient to persuade the firm to produce one more unit of output, it must rise by just enough to cover the marginal cost of that additional unit. If we could tax away the producer surplus, leaving the firm with zero economic profit and being paid the marginal cost of each successive unit, the firm would still stay in business, producing the same level of output.

The point to note here is that the firm's profit does not rise above the zero economic profit level with the supply price – if it did, new firms would enter the industry, meaning that the price being paid satisfy not the “just sufficient” part of the definition of supply price at the industry level. It may be that the owner of a small firm has to work harder as his output expands, and needs to be paid more for the extra effort, but that is part of factor cost, not part of profit – the fact that a part of revenue winds up in an owner-operator's pocket does not necessarily mean that it is profit. If

the competitive firm is in a particular industry, and there is no tendency for firms to enter or leave the industry, it must be that the firm earning an accounting profit just sufficient to keep it in that industry, meaning that it is earning a zero economic profit. Zero economic profit is defined as a total level, not as a rate of accounting profit, and it doesn't increase as output increases.

This last bit – that moving up along the supply price curve in an individual industry does not involve increasing profit – is also a source of possible confusion in the interpretation of Keynes' aggregate supply price curve.

Turning to Keynes' footnote, he begins by writing $Z_w = \phi(N)$, where the subscript w means that he is working in wage units. Since the wage unit is W, $Z_w = Z/W$, where Z is the level of proceeds just sufficient to persuade entrepreneurs to employ N units of labour (where labour is being measured in Keynes' standardized units, not in bodies) and $Z = W\phi(N)$, which will be the source of the slip of the pen at the end of the footnote.

Z is defined as proceeds, which means that it is the difference between a certain level of revenue, A, and a user cost U, $Z = A - U$. We have written this in nominal terms; to convert to wage units we can replace Z_w by $A_w - U_w$ where each "w" subscript means that the relevant term, here A or U, has been divided by W.

Next, note that as defined in the *General Theory*, proceeds is equal to $\Pi + F$ or, in wage units, $\Pi_w + F_w$. This gives us $Z_w = \Pi_w + F_w$. At this point, we have to invoke the definition of supply price, and remember that Keynes is arguing that there is a parallel between his aggregate supply price and the Marshallian supply price for an individual commodity, and also remember that he is working in the Marshallian short run, meaning that there is no change in the total stock of capital and that, by extension, no new firms are entering the industry. As we move along the supply price curve, since the level of profit holds constant at the zero economic profit level, we have $\Delta\Pi_w = 0$. That means that $\Delta Z_w = \Delta F_w$ so the change in the aggregate supply price equals the change in factor costs, both measured in wage units. In the footnote, Keynes also writes $\Delta Z_w = \Delta A_w - \Delta U_w$, which is true by definition but a bit confusing, appearing the way it does – it is

probably this which has led some writers to assume that Keynes is working at the intersection of the aggregate demand and aggregate supply functions.

Now, $\Delta Z_w = \Delta \phi(N) = \phi'(N)\Delta N$, so we have $\Delta F_w = \Delta Z_w = \phi'(N)\Delta N$. This is what Keynes was referring to when he said that along⁷ the aggregate supply function the proceeds of the marginal product equals the marginal factor cost. That is not, as it has sometimes been interpreted, a first order condition, rather it is a definition –as we move along the aggregate supply function, the increase in N causes factor cost to increase so the proceeds which firms would have to receive to just persuade them to employ the new total level of labour, which are measured on the vertical axis, have to increase by exactly the same amount as factor costs increase. Any less, and the new total level of N will not be supported; any more and the firms will be making positive economic profits (i.e. more than a normal accounting profit). So the causality here runs from higher factor costs to higher required proceeds: the ΔZ_w which we observe as we move along the function must equal the ΔF_w which results from the increased N , and because $\Delta \Pi_w = 0$, ΔF_w is the same as $\Delta A_w - \Delta U_w$.

For the next stage, Keynes invokes an old assumption. Back in Chapter 2 when he was explaining the first classical postulate, that labour is hired up to the point where the value of its marginal product would just cover the extra cost incurred as a result of hiring it, he referred to deducting any other costs which the reduction in output resulting from a reduction in employment would avoid. This implies that we are not necessarily looking at the effect of a change in the level of one of the factors, all others held constant. Rather, since we are treating capital as a fixed factor it suggests that a change in the level of employment, resulting as it does in a change in the intensity with which capital is used, also implies a change in the level of other variable factors. We can think in terms of the variable factors as a bundle, used in fixed proportions, so that a change in the level of N results in an equi-proportional change in the level of any other variable factors which the firm uses. This interpretation is made more palatable by the fact that proceeds, as Keynes defines them, are net of user costs and user costs include A_1 , purchases made by one firm from another. This sounds like a strange way of looking at costs, but we need to remember that Keynes is working in value added terms when he defines the Z

⁷ Actually “at every point on”.

curve, and that the payments made to the factors used to produce the A_1 type inputs are included in the aggregate value added. At the level of each firm, once we've excluded the value of the inputs which it has purchased from other firms, the range of variable factors to go in F along with N is pretty limited. If we define W to be a constant marginal factor cost of basic labour, then $F_w = F/W = N$, and $\Delta F_w = \Delta N$.

This is the final step in the derivation of the relation in the infamous footnote, and gives us $\Delta N = \phi'(N)\Delta N$, from which we have $\phi'(N) = 1$. This is clearly a special case: Keynes says that it holds “provided that factor cost bears a constant ratio to wage-cost, and that the aggregate supply function for each firm (the number of which is assumed to be constant) is independent of the number of men employed in other industries, so that the terms of the above equation, which hold good for each individual entrepreneur, can be summed for the entrepreneurs as a whole.”⁸ The result which matters is the one which establishes that along the aggregate supply price function the marginal proceeds necessary to support increasing levels of N are equal to the marginal factor cost of the increased N when the corresponding increases in any other elements of F are taken into account. This parallel between the aggregate supply price curve and the supply price curve for an individual product is what Keynes is getting at here.

As for the slip of the pen, it comes at the end of the passage, where he says “if wages are constant and other factor costs are a constant proportion of the wages-bill, the aggregate supply function is linear with a slope given by the reciprocal of the money-wage.” This is typically taken to refer to the case where the aggregate supply function is written in terms of Z rather than Z_w , so we have $Z = W\phi(N)$ so that $\Delta Z = W\phi'(N)\Delta N$. Since $\phi'(N)$ here is the same as the $\phi'(N)$ which we just solved for, assuming the same conditions hold, it will equal 1 and the slope of the function when it is written in terms of Z will equal W , not $1/W$. (If it were to equal $1/W$, an increase in W would tend to flatten the aggregate supply function, meaning that the higher the wage the lower the proceeds firms would have to receive to support any given level of employment.)

⁸ Since the aggregate supply function is in nominal terms, the independence of the level of employment in other industries condition would be violated if firms had to bid labour away from each other in order to expand their output.

Depreciation:

Having dealt with the definition of user cost (for the moment – he returns to it in the appendix to this chapter), Keynes proceeds to consider other elements of depreciation, broadly defined. In his user cost term he included the part of the loss of the value of a capital which occurs over time as a consequence of the capital being used; now he deals with that part of depreciation which is due to the passage of time alone, regardless of whether the capital is used in production. In one sense this is close to the concept of depreciation we are using when we write, in models of economic growth, $\Delta K_t = I_{t-1} - \delta K_{t-1}$, where $\Delta K_t = K_t - K_{t-1}$ and δ is the depreciation rate, usually taken to be exogenous. In this case if we set $I = 0$, capital dissipates at a rate of δ per period. Whether this is actually strictly exogenous depreciation depends, of course, on the assumptions we are making: if we assume that the capital equipment is being run at a constant intensity, then a constant rate of depreciation could be taken as a simplified representation of the relevant element of the user cost of capital. That assumption would not be unreasonable if we were looking at dynamic steady states, but it is not flexible enough to reflect the circumstances of short run disequilibrium with which Keynes is concerned.

In this section, Keynes is dealing with the case where the entrepreneur faces:

an *involuntary* loss (or gain) in the value of his capital equipment, occurring for reasons beyond his control and irrespective of his current decisions, on account of (*e.g.*) a change in market values, wastage by obsolescence or the mere passage of time, or destruction by catastrophe such as war or earthquake.

The element relating to the mere passage of time corresponds to the way we usually treat depreciation in growth or investment models; the others tend not to be taken account of. These elements, which Keynes refers to as the excess of expected depreciation over user cost (so he is using the term depreciation broadly) he calls supplementary cost; he denotes this element of cost by V .

The fact that he can include obsolescence in his definition of supplementary cost is a consequence of working in nominal terms. Working in physical terms, as we generally do in

growth models, makes it difficult to allow for a factor which does not actually reduce the physical productivity of capital and so cannot really be treated as an element of the radioactive decay approach we usually take to representing depreciation. If we were working with a model in which capital has different vintages we could enter each vintage of capital into the physical production function as a separate input, with newer vintages of capital having higher marginal productivity than older capital, analogous to the way we can treat different age groups of labour, but doing this with vintages of capital is more problematic than doing it with age groups of labour if only because we cannot define a relative productivity measure for capital the way we can for labour. Keynes' approach does not require us to assume that the physical productivity of older capital has declined simply because newer, more advanced capital has come on the market (so the ability of older computers to run various bits of software is not reduced when newer, faster computers come on the market, so long as the software itself will still run) but rather treats obsolescence as a factor which reduces the contribution of the capital to the financial value of the firm. If we think of G in $A + G - A_1$ as contributing to the firm's value in the sense of reflecting the amount the firm could sell its capital for, then obsolescence shows up as a drop in the financial value of the capital, not its physical productivity.

Supplementary cost, as Keynes defines the term, is where the firm's fixed costs show up in his analysis. He defines the net profit of the entrepreneur as the gross profit (which he had defined as $A - F - U$) minus supplementary cost, V , (i.e. as $A - F - U - V$). The discussion at this point in the *General Theory* is essentially a summary of some basic micro theory. When the entrepreneur is making the decision about his short run output level, it is variable costs which matter: "In his capacity as a *producer* deciding whether or not to use the equipment, prime cost and gross profit, as defined above, are the significant concepts." meaning that the competitive firm will produce at the intersection of marginal (variable) cost and price. However, it is the entrepreneur's take home income, his net profit, which determines his spending behavior in his role as consumer, meaning that the fixed cost has to be taken account of when we are looking for a definition of aggregate income to use in analyzing consumption expenditure. When we aggregate across firms, we wind up with a measure of net income defined as $A - U - V$, factor income plus the entrepreneur's net profit.

Keynes introduces one more factor which affects the end of period value of the firm's capital, under the heading of windfall loss. Here he subdivides obsolescence into foreseeable and unforeseeable, taking his lead from Pigou, who, Keynes says, defined normal obsolescence as obsolescence which was predictable in general terms, even if not in precise detail. Exceptional obsolescence and destruction of capital by unpredictable (and uninsurable) catastrophe he counts as elements of windfall losses. Basically windfall losses cover unpredictable negative shocks to the value of the firm⁹.

The material in this section relates to Keynes' efforts to define aggregate concepts of income which make sense both in terms of his own model and in terms of the Marshallian micro model. He argues that net income, as he has defined it, is the income which the typical individual keeps in mind when he's making his consumption decisions, and in particular that when the businessman is making his own consumption decisions (as opposed to the decisions he makes in his role as entrepreneur), he subtracts supplementary (fixed) costs from his net profit to get his spendable income but does not subtract windfall losses in the same way. As Keynes puts it, after an extended attempt to define precisely what would be included under the heading of supplementary costs¹⁰:

Thus we cannot get closer to a quantitative definition of supplementary cost than that it comprises those deductions from his income which a typical entrepreneur makes before reckoning what he considers his income for the purpose of declaring a dividend (in the case of a corporation) or of deciding the scale of his current consumption (in the case of an individual). Since windfall charges on capital account are not going to be ruled out of the picture, it is clearly better, in case of doubt, to assign an item to capital account, and to include in supplementary cost only what rather obviously belongs there. For any overloading of the former can be corrected by allowing it more influence on the rate of current consumption than it would otherwise have had.

All of this discussion falls under the heading of trying to define sensible aggregate concepts. He takes note at this point in Chapter 6 of a couple of other definitions which have been offered for income, one by Hayek and one by Keynes himself. From Hayek:

⁹ Shocks which are sufficiently predictable that the firm could insure against them are included in supplementary costs.

¹⁰ Kaldor and Robinson (1941, 2000) discuss what would be included in prime cost: salaries of a firm's managers and administrative staff are not, nor are advertising costs, since they don't vary with output, but "advertising contained in the package" should be included.

Professor Hayek, for example, has suggested that an individual owner of capital goods might aim at keeping the income he derives from his possession constant, so that he would not feel himself free to spend his income on consumption until he had set aside sufficient to offset any tendency of his investment-income to decline for whatever reason.

Keynes goes on to say “I doubt if such an individual exists; but, obviously, no theoretical objection can be raised against this deduction as providing a possible psychological criterion of net income.” Hayek’s definition sounds basically like a definition of permanent income, albeit one which works best when we are thinking in terms of an infinitely-lived individual. The other proposed definition which he mentions here is his own, from his *Treatise on Money*.

By the time he wrote the *Treatise on Money*, Keynes had come to the view that the prolonged nature of the Slump had something to do with investment behavior, but he had not yet developed the theoretical apparatus of the *General Theory* while, as comments by the Circus and by Hawtrey quickly convinced him, the argument set out in the *Treatise* really didn’t work. In the *Treatise* he developed an argument which depended on savings exceeding investment, but to do that he had to get around the classical argument that savings equaled investment, with equilibrium being achieved through the operations of the interest rate. As a first step to doing that, he redefined income, at least entrepreneurs’ income. In the *Treatise* he defined entrepreneurs’ income not as their actual profit but as their normal, meaning long run equilibrium, profit – using normal profit in the same sense as we do when we refer to a firm’s normal profit as meaning zero economic profit. He then defined an excess of savings over investment as being equal to the excess of normal profits over actual profits. This led Dennis Robertson to remark, in his review¹¹ of the *Treatise*:

How many of those who have taken up the cry that a slump is due to an excess of Savings over Investment, and a boom to an excess of Investment over Savings, realise that the savings which are so deplorably abundant during a slump consist largely of entrepreneurs’ incomes which are not being spent, for the simple reason that they have not been earned?

¹¹ D. H. Robertson (1931): “Mr. Keynes’ Theory of Money” *The Economic Journal* 41(163), 395-411, pg. 407.

Keynes himself, by the time of the *General Theory*, had reverted to more standard definitions of the various types of incomes (Hayek's comment¹² notwithstanding) since, as he put it in terms which one does not often hear academics use about their own work:

I am afraid that this use of terms has caused considerable confusion, especially in the case of the correlative use of saving; since conclusions (relating, in particular, to the excess of saving over investment), which were only valid if the terms employed were interpreted in my special sense, have been frequently adopted in popular discussion as though the terms were being employed in their more familiar sense. For this reason, and also because I no longer require my former terms to express my ideas accurately, I have decided to discard them — with much regret for the confusion which they have caused.

Saving and Investment:

After the business of defining income, Keynes goes on in Part II of Chapter 6 to tackle the real point of the chapter, the relation between saving and investment. He starts from the observation that everyone agrees that saving refers to the excess of income over consumption expenditure, meaning that any confusion about the notion of saving must arise either from confusion about the meaning of consumption or about income. Not surprisingly, he takes as his definition of income the one he has just spent the bulk of the chapter developing, and he takes as his definition of consumption expenditure the value of goods sold to consumers. He acknowledges that there are measurement issues pertaining to the purchase of durable goods by consumers — why should the purchase of a car be defined as consumption and the purchase of a house as investment — but this isn't something which he pursues in the *General Theory*. Instead, he proceeds in terms of the definitions he has set out in the first part of the chapter: aggregate consumption is $\sum[A - A_1]$ which, for convenience, he writes as $A - A_1$. Using the same notation convention for the other aggregates, he writes income as $A - U$ which means that, since consumption is $A - A_1$, saving must be $A - U - [A - A_1] = A_1 - U$. Similarly, in the aggregate, net saving¹³ is $A_1 - U - V$.

¹² About getting bogged down in the definitions in Chapter 6.

¹³ He has defined net income as $A - U - V$, and given that consumption is $A - A_1$, Net Saving, which is defined as net income minus consumption, is $A - U - V - [A - A_1] = A_1 - U - V$.

Next, Keynes represents Investment in terms of his notation. He starts by defining Investment as “the current addition to the value of the capital equipment which has resulted from the productive activity of the period.” As a result of their activities in the period, entrepreneurs wind up having sold a finished output with a total value of A and “with a capital equipment which has suffered a deterioration measured by U (or an improvement measured by $-U$ where U is negative) as a result of having produced and parted with A , after allowing for purchases A_1 from other entrepreneurs”. He has already defined the aggregate $A - A_1$ as aggregate consumption, so the excess of $A - U$ over $A - A_1$, meaning $A_1 - U$, must be the addition to capital during the period, or gross investment, and $A_1 - U - V$ is the net investment resulting from that period’s productive activity.

All of this seems excessively complicated to the present-day reader, especially since he goes on to write something which is standard in introductory textbooks:

Provided it is agreed that income is equal to the value of current output, that current investment is equal to the value of that part of current output which is not consumed, and that saving is equal to the excess of income over consumption — all of which is conformable both to common sense and to the traditional usage of the great majority of economists — the equality of saving and investment necessarily follows. In short—

Income = value of output = consumption + investment.

Saving = income - consumption.

Therefore saving = investment.

Thus *any* set of definitions which satisfy the above conditions leads to the same conclusion. It is only by denying the validity of one or other of them that the conclusion can be avoided.

The reason he is pressing so hard on the savings-investment point is because he wants to emphasize that savings must equal investment by definition, which means that no inference about causality can be drawn from the empirical observation that savings equals investment. This leads to another celebrated Keynes-ism: “Saving, in fact, is a mere residual.”

This remark sits a bit awkwardly with the way he words some of the material in the next few chapters, where it often sounds as if saving is the choice variable in the individual’s problem, and at the same time it is a wording which has led some readers to conclude that the Keynesian

consumer doesn't plan ahead, and doesn't borrow against future income, but rather simply consumes a fixed proportion of his income, as a consequence of some sort of primal psychological drive. The intent of the wording, though, is to emphasize that the current level of aggregate income is determined by the current decisions individuals make about how much to consume and how much to invest:

Clearness of mind on this matter is best reached, perhaps, by thinking in terms of decisions to consume (or to refrain from consuming) rather than of decisions to save. A decision to consume or not to consume truly lies within the power of the individual; so does a decision to invest or not to invest. The amounts of aggregate income and of aggregate saving are the *results* of the free choices of individuals whether or not to consume and whether or not to invest; but they are neither of them capable of assuming an independent value resulting from a separate set of decisions taken irrespective of the decisions concerning consumption and investment. In accordance with this principle, the conception of the *propensity to consume* will, in what follows, take the place of the propensity or disposition to save.

In other words, Keynes is trying to convince his contemporaries that to understand the current state of the economy they have to think in terms of the decisions which economic agents make about factors which affect aggregate demand directly – consumption and investment. His consumer and his firm are both more sophisticated than is often suggested by Keynes' critics, as we shall see when we reach the relevant chapters in the *General Theory*. But before that we have to work through some more material on savings and investment.

Appendix to Chapter 6: “Appendix on User Cost”

User cost is a concept which doesn't get much play in modern presentations of the Keynesian model, and one whose purpose and importance seems to have been unclear to Keynes' contemporaries. T.K. Rymes has published¹⁴ what he characterized as notes of a representative student of Keynes from the period when the *General Theory* was under development, compiled from the (unfortunately few) sets of actual lecture notes he could find. In his volume, Rymes refers to three assessments of the role of user cost in Keynes model, based not just on the former

¹⁴Thomas K. Rymes (1989): Keynes's Lectures 1932-35: Notes of a Representative Student University of Michigan Press.

students' notes but also on being able to speak to them about the matter (many years after the fact of the lectures, obviously). Robert Bryce¹⁵, whose notes on user cost included the notation "Important", presumably based on something Keynes said in a lecture, told Rymes that he thought that the concept of user cost was unclear and underdeveloped and that it was not in fact important for Keynes' theory; Lorie Tarshis¹⁶ said that he thought it was very important in the context of the issue of double counting and value added; and Joan Robinson, who wasn't a student of Keynes but who was a member of the Circus, told Rymes that she thought user cost was just Keynes' way of avoiding having to use the concepts of imperfect competition to explain why prices were above marginal labour costs. She thought that Kalicki's concept of the degree of monopoly was a much better explanation for why price wasn't simply equal to marginal labour cost.

To understand the differences among these assessments, we need to keep in mind that Keynes actually had three objectives in sight in writing the *General Theory*. The most important, of course, was to change the way economists thought about how the macro-economy worked and from that perspective, Bryce is right – the fundamentals of the Keynesian macro model could be set out perfectly well without the detail on user costs.

The second objective was to set out what kind of economic data had to be collected if Keynes' theoretical model was to be of any practical use to policy makers – basically, to set out the principles of Keynesian national income accounting. It is important to remember that, apart

¹⁵ Robert Bryce (1910 – 1997), a Canadian studying at Cambridge, became a member of the Canadian Federal Department of Finance, rising eventually to become Deputy Minister of Finance. He was influential in the Department of Finance, even from his junior days, and is generally regarded as being responsible for the fact that the Canadian federal government was one of the first governments to adopt an explicitly Keynesian stance in its budgetary decisions.

¹⁶ Lorie Tarshis (1911 – 1993) was another Canadian student at Cambridge, and spent his post-student career primarily in academia, first at Stanford, where he became chair of the Economics Department and then in Toronto at York University. He wrote what is generally regarded as the first Keynesian introductory economics textbook, a book whose partisans argue was truer to Keynes' theoretical structure than was Paul Samuelson's introductory text. Tarshis' book was labeled as socialist during the McCarthy Era in the US, leading to many economics departments which had been planning to use it dropping it. When Samuelson's book came along a bit later, the political storm had largely passed and, while there was a certain amount of right wing antagonism to it, for the most part it survived unscathed, and went on to become the dominant introductory economics text.

from some preliminary estimates by Colin Clark¹⁷, whose work Keynes criticized but respected and drew on, there were no consistent estimates of British national income. Even going into the Second World War there were virtually no data on the national income and product and the resources available for the war effort, save for some practically back of the envelope calculations by Keynes himself in conjunction with Erwin Rothbarth¹⁸. Looked at from that perspective, as Tarshis seems to have been doing, the concept of value added, and hence the elements of what Keynes labeled user cost, were of great importance.

The third objective of the *General Theory* was to correct what Keynes saw as errors in micro, as opposed to macro, economic practices of his contemporaries. This is the objective to which Joan Robinson's comment relates. Keynes says at several points in the *General Theory* that it is common for applied economists when studying or explaining price levels to assume that the supply price of an individual commodity should be equal to its marginal factor cost and often to its marginal labour cost. A finding that price is above marginal labour cost is then taken as an indication that the Marshallian model of the competitive firm fails in some regard – hence the Marxist approach of people like Kalicki. Keynes' view was that the reason for the apparent failure of the Marshallian predictions was the failure of analysts to use full variable costs – cost including user cost. In that sense, it is true that the purpose of the device of user cost was to explain why the price of a commodity would be above marginal factor cost, but Joan Robinson (in the 1970s, when Rymes quotes her) was putting her own spin on it¹⁹.

¹⁷ Colin Grant Clark (1905-1989), lecturer in statistics at Cambridge, 1931- 1938, later moved to Australia and became a senior public servant and academic. Keynes referred to him as a bit of a genius, and almost the only really first-class economic statistician he had ever met.

¹⁸ Erwin Rothbarth (1913 – 1944) was a German Jewish economist who was a research student at the LSE from 1936-38 and became a research assistant in statistics at Cambridge in 1938. He was interned on the Isle of Man in May of 1940 as an enemy alien, he was released in August of 1940 as a result of Keynes efforts (Keynes also arranged the release from internment of Piero Sraffa). He joined the British forces as soon as he was legally able to, in 1943, and was killed in action in November of 1944. See Ludo Cuyvers (1983-84): "Erwin Rothbarth's Life and Work" *Journal of Post Keynesian Economics* 6(2), Winter, 305-312.

¹⁹ Kaldor and Robinson (1941, 2000) say (pg. 270) that prime (variable) costs should theoretically include "that extra depreciation of equipment caused by the extra output, which Mr. Keynes calls 'user cost'. But it is doubtful how far depreciation enters into the producers' calculation of prime cost; and the definition relevant to our purposes is not the theoretical prime cost, but what the typical producer regards as such."

The *Appendix on User Cost* is aimed largely at the microeconomic objective, but is worth giving attention because of what it tells us about the producer-side microfoundations of the Keynesian model. Early on in it, Keynes says:

Now in the modern theory of value it has been a usual practice to equate the short-period supply price to the marginal factor cost alone. It is obvious, however, that this is only legitimate if marginal user cost is zero or if supply-price is specially defined so as to be net of marginal user cost, just as I have defined [in Chapter 3] “proceeds” and “aggregate supply price” as being net of aggregate user cost. But, whereas it may be occasionally convenient in dealing with *output as a whole* to deduct user cost, this procedure deprives our analysis of all reality if it is habitually (and tacitly) applied to the output of a single industry or firm, since it divorces the “supply price” of an article from any ordinary sense of its “price”; and some confusion may have resulted from the practice of doing so.

User cost and supplementary cost are being defined broadly here:

Long-period cost must obviously include an amount to cover the basic supplementary cost as well as the expected prime cost appropriately averaged over the life of the equipment. That is to say, the long-period cost of the output is equal to the expected sum of the prime cost and the supplementary cost; and, furthermore, in order to yield a normal profit, the long-period supply price must exceed the long-period cost thus calculated by an amount determined by the current rate of interest on loans of comparable term and risk, reckoned as a percentage of the cost of the equipment. Or if we prefer to take a standard “pure” rate of interest, we must include in the long-period cost a third term which we might call the *risk-cost* to cover the unknown possibilities of the actual yield differing from the expected yield. Thus the long-period supply price is equal to the sum of the prime cost, the supplementary cost, the risk cost and the interest cost, into which several components it can be analysed.

The risk-cost included here is one of the ways Keynes gets longer run, dynamic concepts into his short run model – one element of the fixed costs which a firm has to take into account in its price-quantity decision is the probability that the business will fail at some point during its life.

We also get some basic Marshallian microeconomics:

The short-period supply price, on the other hand, is equal to the *marginal* prime cost. The entrepreneur must, therefore, expect, when he buys or constructs his equipment, to cover his supplementary cost, his risk cost and his interest cost out of the excess marginal value of the prime cost over its average value; so that in long-period equilibrium the excess of the marginal prime cost over the average prime cost is equal to the sum of the supplementary, risk and interest costs.

Basically, this passage says that the profit maximizing price is equal to the marginal cost of production, which is based on variable costs: in long run equilibrium the price must equal marginal cost and also be at the level of the minimum long run average total cost – the break-even level. That means that in long run equilibrium, marginal cost will equal minimum average total cost as well as price, and the gap between that level of marginal (and average total) cost and the average variable cost of the profit maximizing output level will just cover fixed (i.e. supplemental) costs. The language is unfamiliar but the model is the standard textbook model of the perfectly competitive firm.

Perhaps the most important statement in the *Appendix on User Cost*, at least for our purposes, comes at the beginning of Section II:

User cost constitutes one of the links between the present and the future. For in deciding his scale of production an entrepreneur has to exercise a choice between using up his equipment now and preserving it to be used later on. It is the expected sacrifice of future benefit involved in present use which determines the amount of the user cost, and it is the marginal amount of this sacrifice which, together with the marginal factor cost and the expectation of the marginal proceeds, determines his scale of production.

Given the prevalent view that Keynesian economics lacks microfoundations, this element of Keynes' thinking needs to be stressed. His firm is an intertemporal profit maximizer. It is solving an intertemporal optimization problem – one which could easily be set up in optimal control terms – in which the present and the future are linked together not just by the durability of capital and the intertemporal implications of the investment decision but also by the realization that the intensity with which the firm runs its capital will affect the future value of that capital. If we assume that the firm is planning to be around for a long time – set up our optimal control problem as one with an infinite horizon – the intensity will determine how soon the capital will need to be replaced. If the firm is not planning to outlive its capital stock, as in a finite horizon optimal control problem, the sale value of the capital at the end of the planning horizon constitutes what is known as the scrap value of the capital (indeed, of the firm). The more intensely the capital is used during the firm's working life, the lower its scrap value will be. The single period cost function for Keynes' firm includes, then, an element which represents the future implications of the decision which the firm makes about current intensity of capital utilization. This is what Keynes means when he says that "It is the expected sacrifice of future

benefit involved in present use which determines the amount of the user cost, and it is the marginal amount of this sacrifice which, together with the marginal factor cost and the expectation of the marginal proceeds, determines his scale of production.” Keynes’ firm, then, is an intertemporal profit maximizer and although he is focused in the *General Theory* on responses to short run fluctuations in demand, the firm’s response to a short term demand shock is determined by a set of cost curves which incorporate elements reflecting the long term cost implications of short term decisions. Again, Keynes is building a long term perspective into the theoretical underpinnings of his model, even though the model is a short term model. The firm is treating its capital stock as fixed, but its marginal cost curve includes an element which reflects how soon that capital will have to be replaced. There’s even a hint of real option theory here:

We have defined the user cost as the reduction in the value of the equipment due to using it as compared with not using it, after allowing for the cost of the maintenance and improvements which it would be worth while to undertake and for purchases from other entrepreneurs. It must be arrived at, therefore, by calculating the discounted value of the additional prospective yield which would be obtained at some later date if it were not used now. Now this must be at least equal to the present value of the opportunity to postpone replacement which will result from laying up the equipment; and it may be more.

This is also the basis for Keynes’ discussion of redundant (i.e. currently idle) capital and his explanation of the impact of scrapping part, but not all, of the redundant capital on the price of output today – scrapping even part of the redundant capital brings closer the date when the remainder will be used and therefore the date at which it will have to be replaced, and that will be built into the user cost element of the firm’s current variable costs, even though some of the un-scrapped portion of the capital is still not being used. User cost might, as Robert Bryce suggested to T.K. Rymes, have been a relatively unimportant aspect of Keynes’ primary theoretical apparatus, but understanding what it is and why it is there is important to our understanding of Keynes, today.

Chapter 7: “The Meaning of Saving and Investment Further Considered”:

Chapter 7 of the *General Theory* is another of the several chapters which deal with saving and investment. It is not always easy, today, to explain why Keynes spent so much of the book on this material, but the answer basically lies in the fact that he was trying to make three points of his argument absolutely clear to his audience. First, saving always equals investment. Second, the mechanism which links saving and investment and guarantees their equality is not the one taken for granted by most classical economists. And third, an increase in saving will not cause investment to increase.

He begins Chapter 7 by saying that everybody agrees on the definition of saving – it is the excess of income over consumption – and that there is pretty general agreement on what consumption means, so that any disagreement about the relation between saving and investment must be due to the use of different definitions of income or of investment. He notes that in his *Treatise on Money* he was guilty of defining income in a manner which allowed saving to differ from investment – one objective in Chapter 7 of the *General Theory* is to undo the confusion he had thereby caused.

He starts, in Section II of the chapter, with the definition of Investment, and here gets into an issue which is still a source of confusion, at least in undergraduate economics programs. In microeconomics we define investment broadly as a process by which present consumption is sacrificed in order to increase future consumption. In other words, when we’re working at the micro theory level we tend to define investment as being essentially the same as saving, and we often refer to doing this through stock market and other financial investments. At the macro level we generally follow Keynes, and use investment to refer to increases in the aggregate physical capital stock. Keynes tackles the relation between the aggregate and micro definitions this way:

Let us take *Investment* first. In popular usage it is common to mean by this the purchase of an asset, old or new, by an individual or a corporation. Occasionally, the term might

be restricted to the purchase of an asset on the Stock Exchange. But we speak just as readily of investing, for example, in a house, or in a machine, or in a stock of finished or unfinished goods; and, broadly speaking, new investment, as distinguished from reinvestment, means the purchase of a capital asset of any kind out of income. If we reckon the sale of an investment as being negative investment, *i.e.* disinvestment, my own definition is in accordance with popular usage; since exchanges of old investments necessarily cancel out.

If we think about what we mean by stock market investments, we note that most purchases of stocks on the market are actually secondary market transactions, meaning that they are purchases and sales of shares in a company by people whose only connection to the company is ownership of some of its stock. It is very seldom the case that Microsoft is involved in purchases or sales of Microsoft stock – most of those transactions are between people who have, and people who want to have, shares in Microsoft in their individual financial portfolios. The individual who is buying the shares regards this as an investment, which is fine in Keynes' terms so long as we regard the sale of the stock by its previous owner as a disinvestment. When we mark the sales side of the transaction with a negative sign, then in an aggregate measure of investment this transaction washes out. It is simply a reallocation of a fixed supply of assets across individuals, with one individual giving up cash and acquiring shares and the other giving up shares and acquiring cash. This often is still the case if the sale does involve the company whose stock is being traded – an Initial Public Offering, for example²⁰. In an IPO the exchange is still a mutual portfolio reallocation, and only translates into an increase in aggregate investment if the issuing firm takes the cash and buys new physical capital with it. If the owners of the firm doing the IPO are simply swapping cash now for a part of the future stream of profits to which their shares would have entitled them²¹. We can, then, find aggregate investment by adding up all of the transactions which people tend to call investment so long as we enter the sales of the existing assets with a negative sign. If we do that, all of these swaps of shares for cash will cancel out and we will be left with what we, and Keynes, refer to as aggregate investment, meaning swaps of cash for newly produced units of physical capital equipment.

²⁰ In the *Treatise on Money* Vol. II, Book VI, Chapter 27, Keynes says: "It might have been supposed that the volume of new issues on the investment market would provide a reasonably accurate index [of the amount of addition to the capital stock]. On the other hand, many so-called new issues merely represent the transfer of existing assets from one party to another; whilst in the case of holding, finance and investment companies there may be a large element of duplication." The elipses refers to a sentence on housing investment.

²¹ For a well-known recent example, consider the Facebook IPO.

Those swaps for physical capital are also referred to as investment activity at the level of the individual firm – Keynes’ point here is that if we are careful about how we do our accounting, these are the only types of investment which don’t get cancelled out in the aggregation process. There is, in other words, no contradiction between the way we use the term investment in micro and financial economics and the way we use it in macroeconomics so long as we are careful to keep the aggregation process clear in our minds.

Keynes then goes on to talk about with sub-categories of aggregate investment:

Investment, thus defined, includes, therefore, the increment of capital equipment, whether it consists of fixed capital, working capital or liquid capital; and the significant differences of definition (apart from the distinction between investment and net investment) are due to the exclusion from investment of one or more of these categories.

By liquid capital²² he means what we today term inventories, and he goes on to discuss the importance which Ralph Hawtrey put on inventory investment as a driver of the level of aggregate economic activity:

Mr. Hawtrey, for example, who attaches great importance to changes in liquid capital, *i.e.* to undesigned increments (or decrements) in the stock of unsold goods, has suggested a possible definition of investment from which such changes are excluded. In this case an excess of saving over investment would be the same thing as an undesigned increment in the stock of unsold goods, *i.e.* as an increase of liquid capital. Mr. Hawtrey has not convinced me that this is the factor to stress; for it lays all the emphasis on the correction of changes which were in the first instance unforeseen, as compared with those which are, rightly or wrongly, anticipated.

²² In his *Treatise on Money* (1930), Volume I Book III Ch. 9, section (iii) on The Classification of Capital, Keynes defines three classes of capital: Fixed Capital, which consisted of “Goods in use, which are only capable of giving up gradually their full yield of use or enjoyment”, Working Capital, which included “Goods in process, *i.e.* in course of preparation by cultivation or manufacture for use or in consumption, or in transport, or with merchants, dealers and retailers, or awaiting the rotation of the seasons” and Liquid Capital, meaning “Goods in stock, but which are yielding nothing but are capable of being used or consumed at any time”. He goes on to say “In the case of unfinished goods there is sometimes ambiguity as to whether raw materials are best regarded as liquid or in process. In Vol, ii chap. 28 we shall complete our definition to the effect that normal stocks required for efficient business are part of Working Capital and therefore in process, whilst surplus stocks are to be regarded as liquid. Thus the unfinished goods existing at any time consist partly of Working Capital and partly of Liquid Capital.” Note that Keynes’ definition of Fixed Capital as including goods which give up their enjoyment gradually would put consumer durables in this category.

It was Hawtrey who convinced Keynes to focus on quantity responses as the first response to changes in aggregate demand, and it's from Hawtrey that we get the story which we use in teaching the Keynesian model in introductory macroeconomics courses, that the first signal which firms have of a decline in demand for their products is when they observe that their sales are less than expected and as a result their inventories are larger than they had planned to hold. We refer to this as unplanned inventory investment²³. Holding inventories imposes costs on the firm, so its response to what it sees as likely to be a prolonged drop in sales (and hence increase in inventories above its original profit maximizing level) will be to cut back on its orders from its suppliers (which includes cutting back on its own production if it is selling its own output), and this sets off a downward multiplier process. The opposite, of course, happens when firms find their inventories falling below the desired level. Keynes goes on to say:

Mr. Hawtrey regards the daily decisions of entrepreneurs concerning their scale of output as being varied from the scale of the previous day by reference to the changes in their stock of unsold goods. Certainly, in the case of consumption goods, this plays an important part in their decisions. But I see no object in excluding the play of other factors on their decisions; and I prefer, therefore, to emphasise the total change of effective demand and not merely that part of the change in effective demand which reflects the increase or decrease of unsold stocks in the previous period. Moreover, in the case of fixed capital, the increase or decrease of unused capacity corresponds to the increase or decrease in unsold stocks in its effect on decisions to produce; and I do not see how Mr. Hawtrey's method can handle this at least equally important factor.

It is important to note that Keynes is not rejecting Hawtrey's story here, rather he is saying that Hawtrey is expecting unplanned fluctuations in inventories to carry too much of the load of explaining downturns. Forward looking firms might well see signs of a downturn before it actually hits, and cut their orders before their inventories have a chance to build up and, as he says, in some cases, the rate of capacity utilization is the counterpart of inventory build-up. A coffee shop, to take a simple example, doesn't keep inventories of finished products, so when demand for its product falls it sees fewer people walking into the store and its output automatically falls (of course, it will experience an unplanned increase in its inventories of coffee

²³ I am crediting this to Hawtrey, but the economists of the Stockholm school were also working with the notions of *ex ante* and *ex post*, or planned and unplanned savings and investment at this time. On the Stockholm school see Bertil Ohlin (1937a) "Some Notes on the Stockholm Theory of Savings and Investment I" *Economic Journal* 47 (185), March, 53-69 and Bertil Ohlin (1937b) "Some Notes on the Stockholm Theory of Savings and Investment II" *Economic Journal* 47 (186), June, 221-240.

beans). Again, Keynes argument is not that Hawtrey is wrong (and we don't have to stop using the inventory story in introductory macro), it is that when we are looking at actual aggregate data, unplanned inventory fluctuations cannot carry the whole load of explaining downturns. As far as the theme of Chapter 7 is concerned, Keynes is arguing that Hawtrey is proposing to exclude unplanned inventory fluctuations from the definition of investment, and basically saying that this change in the definition of the term "investment" is an unnecessary complication.

Hawtrey, incidentally, objected to Keynes' saying that his (Hawtrey's) model was focused on unplanned inventory adjustment; Hawtrey's interpretation of his own model included foreseen as well as unforeseen adjustments in inventory. The issue of the role of inventories in driving investment was also key to the disagreement between Keynes and Hawtrey on the channel through which monetary policy worked. They agreed that it operated through the interest rate (as opposed to operating through a more direct Quantity Theory of Money mechanism) but whereas Keynes took the view that it was the long term interest rate, working through investment in fixed capital, which mattered, Hawtrey, arguing that inventory investment was the most important channel linking the monetary and goods sectors, took the view that it was short term interest rates which mattered, since these determined firms' costs of holding inventories and therefore their willingness to order goods from manufacturers.

In section III of Chapter 7 (after taking a swipe at the Austrian school in the last paragraph of section II) Keynes turns to definitions of income. Here he starts by correcting the mistake he now sees himself as having made in his *Treatise on Money*, where he defined the notion of normal profit and then defined entrepreneurs' income as including not their actual profit but their normal profit. Then, in the *Treatise* he defined an excess of saving over investment as a situation in which entrepreneurs were earning less than a normal profit. There is a logic here – if saving rises and hence consumption falls, sales will fall and we would expect profit to fall below its normal level. The problem from an analytical point of view is that as Keynes defined income in the *Treatise*, his measure of entrepreneurs' income would be more than they were actually getting. Hence Dennis Robertson's remark in his review²⁴ of the *Treatise* that "the savings which are so deplorably abundant during a slump consist largely of entrepreneurs' incomes

²⁴ D. H. Robertson (1931): "Mr. Keynes' Theory of Money" *The Economic Journal* 41(163), 395-411, pg. 407.

which are not being spent, for the simple reason that they have not been earned”. In the *Treatise* Keynes had come to the view that the Slump had something to do with saving and investment, but he still hadn’t worked out a really satisfactory model of what was going on. Under the *Treatise* definitions, measuring the amount of the deficiency of saving would involve calculating income on the basis of what it would be if firms were earning a normal profit, and that would, at the very least, lead to considerable confusion in reporting national income²⁵.

Having repudiated his own *Treatise* definition of income²⁶ he then turns to a definition which he ascribes to Dennis Robertson:

Mr. D. H. Robertson has defined to-day’s income as being equal to *yesterday’s* consumption *plus* investment, so that to-day’s saving, in his sense, is equal to yesterday’s investment *plus* the excess of yesterday’s consumption over to-day’s consumption. On this definition saving can exceed investment, namely, by the excess of yesterday’s income (in my sense) over to-day’s income.

Robertson tended to think in terms of dynamic economic processes – in period analysis. Thus his definition of income in period t – call it Y_t^R was

$$Y_t^R = C_{t-1} + I_{t-1}$$

meaning that economic activity last period produces aggregate income as measured at the beginning of this period²⁷. Then if we define current saving as the difference between current income and current consumption, $S_t = Y_t - C_t$, in Robertson’s terms saving would be measured as

$$S_t^R = Y_t^R - C_t = C_{t-1} + I_{t-1} - C_t = I_{t-1} + [C_{t-1} - C_t]$$

hence Keynes’ definition in the quote above. Keynes goes on to say:

²⁵ You can argue, of course, that we run into the same problem in defining “potential income” when we are trying to measure the depth of a downturn. The problem is more in the confusion caused by the way Keynes was using the word “income” than by the concept he was getting at.

²⁶ With the splendidly straightforward observation: “But the exposition in my *Treatise on Money* is, of course, very confusing and incomplete in the light of the further developments here set forth.” *General Theory* Chapter 7 pg. 78.

²⁷ The need to decide when things occur and whether there is a lag (one period, perhaps) between, say, investment spending and the increase in the capital stock, is an ever-present issue when we are doing dynamic economic analysis in discrete time terms as opposed to doing it in continuous time terms.

Thus when Mr. Robertson says that there is an excess of saving over investment, he means literally the same thing as I mean when I say that income is falling, and the excess of saving in his sense is exactly equal to the decline of income in my sense.

Here, if we define Keynes' income as not involving time lags, so

$$Y_t^K = C_t + I_t$$

then

$$\begin{aligned} Y_t^K - Y_{t-1}^K &= [C_t + I_t] - [C_{t-1} + I_{t-1}] = C_t + I_t - C_{t-1} - I_{t-1} = I_t - C_{t-1} - I_{t-1} + C_t \\ &= I_t - [I_{t-1} + C_{t-1} - C_t] = I_t - S_t^R \end{aligned}$$

So if savings today exceeds investment spending today in Robertson's terms, meaning that the right hand side of this last expression is negative, it must be that the left hand side, $Y_t^K - Y_{t-1}^K$ is also negative, so that in Keynes terms income is falling – income today is less than income yesterday. Hence Keynes' observation in the last quote above.

Having dealt with confusions arising from differences in the way different people (including his earlier self) used the term income, Keynes next turned, in section IV of Chapter 7, to a brief discussion of the concept of forced savings. This section is again basically a re-thinking of something which he had said in the *Treatise*, where:

...I gave some references to earlier uses of this phrase and suggested that they bore some affinity to the difference between investment and "saving" in the sense in which I there used the latter term. I am no longer confident that there was in fact so much affinity as I then supposed. In any case, I feel sure that "forced saving" and analogous phrases employed more recently (*e.g.* by Professor Hayek or Professor Robbins) have no definite relation to the difference between investment and "saving" in the sense intended in my *Treatise on Money*. For whilst these authors have not explained exactly what they mean by this term, it is clear that "forced saving", in their sense, is a phenomenon which results directly from, and is measured by, changes in the quantity of money or bank-credit.

Dennis Robertson, in his “Theories of Banking Policy”²⁸ discussed forced savings in terms of the effects of an increase in the money supply:

First, the newly created money in the hands of the banks’ nominees, is continually pouring on to the markets in competition with the existing money in the hands of the public, raising prices against the public, and depriving it of consumption which it expected to enjoy. Secondly, this rise in prices entails a diminution in the real value of the public’s holdings of money: and it is at least possible that some of them will seek to restore this value towards its old level, and to that end refrain from consumption to which they are legally entitled, thereby performing an additional act of saving beyond that to which they are actually compelled by the action of the banks. This additional saving on their part is *in a sense* voluntary: but since they are induced to do it by the consequences of the previous action of the banks, we may fairly include it for our purposes under the general term “forced savings” which I propose to apply to the resources diverted in this way from the general consumer to the nominees of the banks.

To Robertson, then, forced savings is in part what we refer to as an inflation tax, where an increase in the money supply in the hands of the government (which is the way we usually discuss it today, the increase in the money supply having been a decision of the central bank, not the banking system) increases the government’s command over commodities relative to that of consumers in general, forcing consumers to consume less than they had planned. The tax shows up in the inflation caused by the monetary expansion, which doesn’t just reduce the real purchasing power of consumers’ nominal consumption expenditure, but also reduces the real value of their assets. Robertson suggests that there is an additional reduction in consumption as consumers try to restore at least part of the real value of their accumulated assets.

The second element – consumers’ efforts to restore the real value of their financial wealth – is, as Robertson notes, a voluntary change in their propensity to save out of current income. It is not so easy, intuitively, to justify using the term saving for the first part – forced frugality perhaps, rather than forced saving.

Keynes’ comment on forced saving is interesting:

²⁸ D. H. Robertson(1928): “Theories of Banking Policy” *Economica* No. 23 (June), pp. 131-146, also in *Essays in Money and Interest* by Dennis Robertson, selected by Sir John Hicks, Collins, Fontana Library, 1966, quote from pg. 27 of that volume.

It is evident that a change in the volume of output and employment will, indeed, cause a change in income measured in wage-units; that a change in the wage-unit will cause both a redistribution of income between borrowers and lenders and a change in aggregate income measured in money; and that in either event there will (or may) be a change in the amount saved. Since, therefore, changes in the quantity of money may result, through their effect on the rate of interest, in a change in the volume and distribution of income (as we shall show later), such changes may involve, indirectly, a change in the amount saved. But such changes in the amounts saved are no more “forced savings” than any other changes in the amounts saved due to a change in circumstances; and there is no means of distinguishing between one case and another, unless we specify the amount saved in certain given conditions as our norm or standard. Moreover, as we shall see, the amount of the change in aggregate saving which results from a given change in the quantity of money is highly variable and depends on many other factors.

The important thing to notice about this is that, not surprisingly, Keynes is analyzing the effects of changes in the money supply in terms of the Keynesian model. Because of Keynes’ tendency to invoke bits of his model before he has explained them, it is not always easy, reading through the *General Theory*, to keep track of the logic of his arguments. Still, here it’s fairly easy to see how his analysis of forced saving differs in a key way from Robertson’s²⁹. Robertson’s explanation invoked the Quantity Theory of Money, talking as it did about how the increase in the money supply raised the price level – the inflation tax. Keynes, having liberated himself, as he put it, from the Quantity Theory was presumably not inclined to invoke it at this point. His exposition of forced saving, then, involves changes in the quantity of money changing the rate of interest and thence the level and distribution of aggregate income, with changes in the aggregate amount of saving following as consequences of those changes (and not directly from the change in the interest rate). He and Robertson come closest to agreement when Robertson talks about certain changes in saving behavior being in a sense voluntary and Keynes says that certain changes in saving behavior are no more “forced” than are any other changes which are responses to changes in other factors.

Keynes goes on to criticize economists who invoked the notion of forced savings for ignoring the fact that, in Bentham’s original statement of the notion it was assumed that the economy was at full employment:

²⁹ Keynes does not cite the 1928 Robertson paper, we are simply taking it as an example of a clear explanation of how some economists thought about the concept of forced saving.

“Forced saving” or “forced frugality” was, in the first instance, a conception of Bentham’s; and Bentham expressly stated that he had in mind the consequences of an increase in the quantity of money (relatively to the quantity of things vendible for money) in circumstances of “all hands being employed and employed in the most advantageous manner”. In such circumstances, Bentham points out, real income cannot be increased, and, consequently, additional investment, taking place as a result of the transition, involves forced frugality “at the expense of national comfort and national justice”. All the nineteenth-century writers who dealt with this matter had virtually the same idea in mind.

Again, note that Keynes does not invoke the Quantity Theory, though he comes close. He reconciles it with his own model, though, when he goes on to say:

It is true, of course (owing to the fact of diminishing returns to an increase in the employment applied to a given capital equipment), that *any* increase in employment involves some sacrifice of real income to those who were already employed, but an attempt to relate this loss to the increase in investment which may accompany the increase in employment is not likely to be fruitful.

So an increase in the money supply may reduce the real income of labour, but it would do so because, by driving the interest rate down it will increase employment and because the labour market is always on the Marginal Revenue Product of Labour curve, as employment increases the real wage will fall. So through the Keynesian mechanism he is able to find the same effect of an increase in the money supply on labour’s real income as underlies Robertson’s explanation of forced saving. It remains true, however, that any change in saving behavior which follows cannot be termed forced in any meaningful sense³⁰.

³⁰ A recent invocation of the notion of forced savings can be found in a review by Edward Chancellor of Michael Pettis’s book *The Great Rebalancing* (Edward Chancellor (2013) “A Banking Paper Tiger” *Wall Street Journal* Feb 28, pg. A13). Chancellor writes:

“Mr. Pettis’s “The Great Rebalancing” describes the economic policies in china that have facilitated the rise of [the China Development Bank]. He explains how China’s undervalued currency has had the effect of reducing the purchasing power of household incomes in China. Savers are also hurt by the policy of keeping interest rates below the rate of inflation. Artificially low interest rates cost households anywhere between 3% and 8% of GDP annually in forgone deposit income.

“As a result of these policies, the incomes of Chinese workers have lagged behind economic growth for two decades. The consumption share of GDP fell to a low point of 34%. (The norm for Asian economies is 50%-55%.) The repression of Chinese consumers has provided the excess savings needed to fund the country’s continuing investment boom.”

In Section V of Chapter 7, Keynes goes on to discuss why the idea that savings and investment “taken in their straightforward sense”³¹ can differ from each other is so widely believed. He argues that the basis of the explanation lies in a misunderstanding of the accounting of banking transactions:

The prevalence of the idea that saving and investment, taken in their straightforward sense, can differ from one another, is to be explained, I think, by an optical illusion due to regarding an individual depositor’s relation to his bank as being a one-sided transaction, instead of seeing it as the two-sided transaction which it actually is. It is supposed that a depositor and his bank can somehow contrive between them to perform an operation by which savings can disappear into the banking system so that they are lost to investment, or, contrariwise, that the banking system can make it possible for investment to occur, to which no saving corresponds.

There was a widely held view that Keynes’ model depended on the existence of idle savings – a pool of funds stashed away, probably in banks, which needed to be activated for investment purposes if the economy was to recover. This was the interpretation which some Treasury officials, for example, put on Keynes’ argument, and Hawtrey seems to have thought in these terms. To Keynes, the belief in the existence of a pile of unused savings implied a failure to understand a key element of his model – saving must always equal investment and if the economy falls in to a Slump because of a drop in investment, aggregate saving must fall until it equals aggregate investment. Similarly, if consumption falls because people increase their rate of saving, the extra savings do not pile up in the bank, waiting to be used. Rather, the fall in consumption results in a fall in income which pulls aggregate saving back down until, at the new savings rate, the level of aggregate saving equals the (in this example unchanged) level of aggregate investment. Some individuals, whose incomes don’t fall with the Slump, might wind up with higher savings, but the aggregate level of saving will just equal the aggregate level of investment. The confusion arose when people saw monies deposited in the banks, and sometimes referred to as idle funds, as piles of unused savings.

³¹ One of the objectives of Keynes’ discussion is to keep the basic concepts straightforward – hence his repudiation of his own hard to remember *Treatise* definition of income and his rejection of models which made savings differ from investment by excluding items from investment which by all rights should be included.

The discussion here harks back to the discussion earlier in this chapter about trades on the secondary market for shares (the stock exchange) involving balancing acts of investment and disinvestment:

But no one can save without acquiring an asset, whether it be cash or a debt or capital-goods; and no one can acquire an asset which he did not previously possess, unless *either* an asset of equal value is newly produced or someone else parts with an asset of that value which he previously had. In the first alternative there is a corresponding new investment: in the second alternative someone else must be dis-saving an equal sum. Moreover, if it is the banking system which parts with an asset, someone must be parting with cash. It follows that the aggregate saving of the first individual and of others taken together must necessarily be equal to the amount of current new investment.

The notion that the creation of credit by the banking system allows investment to take place to which “no genuine saving” corresponds can only be the result of isolating one of the consequences of the increased bank-credit to the exclusion of the others.

Even when the banking system is involved in the transaction what is happening is simply an exchange of assets. Aggregate investment only happens when there is an addition to the capital stock.

Notice that Keynes is not saying that the banking system can't finance investment. His focus in this chapter is on the necessary equality between saving and investment. When a firm borrows from a bank, all that has happened at that stage is that the bank has acquired an asset – the loan – and the firm has incurred a liability – the loan³². The firm can then use the funds it has borrowed from the bank to buy new capital equipment, and it is at that stage that investment happens. The new investment spending will cause income to increase and the increase in income will be large enough, because of the operation of the multiplier, for the increase in saving which goes along with it to match the increased investment spending which set the whole process off. So, and this is what is important to Keynes' argument, while the borrowing from the bank makes the investment possible, as soon as the investment happens, saving will rise to equal the

³² The mechanism by which a loan is made – the bank opening an account in the name of the borrower – means that we say that in fact the bank has acquired an asset, the loan, and a corresponding liability – the deposit. We can say the same kind of thing with regards to the firm. Keynes makes the point early in the chapter that, when we're doing our calculations we have to be careful about keeping track of the creation and discharge of debts “but since for the community as a whole the increase or decrease of the aggregate creditor position is always exactly equal to the increase or decrease of the aggregate debtor position, this complication also cancels out when we are dealing with aggregate investment.”

increased level of investment. In particular, it was not a matter of the bank making idle savings available for investment purposes. The economy being in a Slump, the banking system had scope for an expansion of bank credit – the money supply – which could then be used to finance the investment which caused the level of saving to increase to match. The banks extension of credit to a firm which is planning to add physical capital makes that transaction possible, but it is the spending of the funds on the investment goods which add to aggregate income and which, through the multiplier, causes income to increase sufficiently to generate the additional saving necessary to match the increased investment³³.

A bit further on in the discussion in Section V of the effects of an increase in investment financed by borrowing from the banks we get one of those bits which make the *General Theory* so frustrating for the modern reader to tackle:

It is also true that the grant of the bank-credit will set up three tendencies (1) for output to increase, (2) for the marginal product to rise in value in terms of the wage-unit (which in conditions of decreasing return must necessarily accompany an increase of output), and (3) for the wage-unit to rise in terms of money (since this is a frequent concomitant of better employment); and these tendencies may affect the distribution of real income between different groups.

This statement comes out of the fact that Keynes has a complete model in mind – our problem as readers comes from the fact that as of Chapter 7 he hasn't yet shown us all of the bits of that model. At this point, the model as we have been shown it is underdetermined – we have more unknowns than we have equations. To fully analyze what Keynes is saying in this excerpt we really need to have a Keynesian relation for nominal wages and a Keynesian relation for prices and we don't yet have those – all we have is a relation for the real wage – the marginal productivity of labour condition.

Tackling Keynes' three points in a slightly out-of-order fashion, we see that the first point, about output increasing, follows in a straightforward fashion from the assumption that we are in a Slump and that firms have, for whatever reason, borrowed from the banks in order to finance real

³³ At this point, Keynes is assuming that the expansion of investment is fully anticipated and the entire dynamic process works itself out instantaneously. Later, he allows for the effect of lags.

investment spending. This will increase demand and hence employment in the capital goods industries, so output will increase.

Jumping ahead to the third point, about the wage unit rising in money terms, we need to remember that the wage unit is the money-wage paid for an hour of basic labour. When the demand for labour increases because firms have increased their investment spending, it is likely that the money-wage paid to basic labour, and hence to all other types of labour³⁴ will rise. We don't, at this point in the exposition, have any more precise explanation for the determination of the nominal, or money-wage, and note Keynes' parenthetical remark to the effect that an increase in money wages is "a frequent concomitant of better employment".

Turning back to the second point, that the value of the marginal product of labour must rise in terms of the wage unit, Keynes is here saying that the value (in money terms) of the marginal product of labour must rise relative to the money-value of the basic wage unit. This comes out of the fact that the value of the marginal product of labour is the output price multiplied by the marginal physical product of labour, and the fact that as employment increases the marginal physical product of labour must decline. Keynes, remember, accepts the first classical proposition about labour markets; that labour is paid the value of its marginal product. We can't yet say what has happened to the nominal wage and we can't yet say what has happened to the price level, but we know that the real wage must have fallen because, holding capital fixed, as employment increases the marginal physical product of labour must fall. So we can say that if money-wages increase as employment increases, prices must increase by proportionately more, so the real wage will fall. This is the counterpart of Keynes earlier discussion about the counter-cyclicity of the real wage when the capital stock is held constant. In a contraction, the money-wage will probably fall but since the real wage must rise to reflect the increased marginal physical productivity of labour, prices must fall by proportionately more than the money-wage falls and in a recovery money-wages will probably rise but the fact that the marginal physical product of labour must fall means that prices must rise by proportionately more. To say how much prices must change we need to have an equation for the nominal wage of basic labour and to know that the labour demand curve looks like, since that will tell us what the real wage will

³⁴ Since the difference in money-wages across skill classes of labour reflects the relative productivities of those types of labour – labour twice as skillful as basic labour earns twice the hourly wage of basic labour.

have to be and hence, given the change in money wages, what the change in prices will have to be.

This also helps explain why it has been so easy for economists to see the model of the *General Theory* as a sticky nominal wage, disequilibrium model. In an upturn, money-wages rise but by proportionately less than prices rise and in a downturn, according to Keynes, money-wages fall but by proportionately less than prices fall. Looking at the data we seem to see stickiness of money wages retarding labour market clearing, whereas to Keynes the data showed that the wage/employment point is always on the curve representing the value of the marginal product of labour.

Following the bank credit discussion, of which the business about wage units was part, Keynes returns to the message he really wants to get across in this chapter:

Thus the old-fashioned view that saving always involves investment, though incomplete and misleading, is formally sounder than the newfangled view that there can be saving without investment or investment without “genuine” saving. The error lies in proceeding to the plausible inference that, when an individual saves, he will increase aggregate investment by an equal amount. It is true, that, when an individual saves he increases his own wealth. But the conclusion that he also increases aggregate wealth fails to allow for the possibility that an act of individual saving may react on someone else’s savings and hence on someone else’s wealth.

Here, too, we get Keynes’ statement of the paradox of thrift: if a single individual increases his saving when nobody else does, then in return for the reduction in his consumption he gets an increase in his wealth, but if everybody tries to increase their saving at the same time, the reduction in consumption will cause income to fall with the result that the aggregate level of accumulated assets will turn out to be exactly the same as it was before (the same, since in this story aggregate investment has not decreased and aggregate saving must equal aggregate investment). Further:

Both these propositions follow merely from the fact that there cannot be a buyer without a seller or a seller without a buyer. Though an individual whose transactions are small in relation to the market can safely neglect the fact that demand is not a one-sided transaction, it makes nonsense to neglect it when we come to aggregate demand. This is the vital difference between the theory of the economic behaviour of the aggregate and

the theory of the behaviour of the individual unit, in which we assume that changes in the individual's own demand do not affect his income.

One of Keynes' primary criticisms of what he termed classical macroeconomics was what he saw as the belief that the *ceteris paribus* assumptions which make sense when we are looking at the behavior of a single individual also make sense when we are looking at the behavior of the economy as a whole. This objection underlies his argument that the labour market cannot be analyzed in isolation from the rest of the economy and also his rejection of what he saw as the classical relation between savings and the interest rate, which occupies several chapters a bit later on in the *General Theory*.