The Scales and the Dam
Static and Dynamic Conceptions of the Economy

I.) Introduction: The Scarcity Complex.

'The world is obsessed, or possessed, by a scarcity complex... On the one hand, we have an enormous and increasing capacity to produce the goods and services which are the *primary* objective of civilisation and which probably form the material basis on which alone a cultural superstructure can be raised. On the other hand we have an immense population not only unable to obtain from the shops, which are so anxious to sell, those goods which they are unable to buy, but are, by the miscalled unemployment problem, prevented from producing still further goods. Ordinary common sense alone seems to be required to recognise that only one thing stands between this practically unlimited capacity to produce, and what is in fact a definitely limited capacity to consume, and that is the money system, the bottle-neck which separates production and consumption.'

- Major Douglas, *The Monopoly of Credit*, pages 89-90.

One of the very first lessons in a typical introductory economics course - and rarely, if ever questioned by either teacher or pupil - is the existence of resource scarcity coupled with the unlimited desires of humanity. Students are then informed that economics is the 'science' of managing (rather than *overcoming*) this scarcity - and in time, they learn how to manage it in their favour at the expense of others. As the orthodox economist Professor Lionel Robbins put it:

'Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.'[i]

Thus scarcity is assumed and then placed not only as a foundation stone of the subject, but as a demarcating factor prescribing the limits within which the study of the economy is to be undertaken. The precise nature of these 'scarce means' is also left open: whether it is paucity of energy, of time, of certain critical resources, of personnel, - or a combination thereof, is not directly addressed, lest an inquisitive student look into the limits of scarcity and discover more than he should. As a result, countless researchers earnestly investigate the tip of the iceberg - and presume a scarcity of ice.

If the impact of the scarcity complex was limited to academia, it would be bad enough - but as Major Douglas noted, the complex exerts a much wider influence. In particular, it profoundly shapes the public's conception of the relationship between money and goods, thereby preventing it from grasping solutions to problems which, at bottom, only require the application of 'ordinary common sense'.

The scarcity complex tends to lead to the perception of the output of goods and services as a stock rather than as a flow - a stock whose size can only be increased with great difficulty. Money is regarded as a stock as well, and thus, the relationship between the two, (the fundamental relationship in economics) is seen as a relation between two stocks. The metaphor that comes immediately to mind when comparing two quantities is that of a weighing scale. Analysing, critiquing and replacing this metaphor is the task undertaken here.

II.) The Scales: The Static Conception of the Economy.

For millennia, merchants used weighing scales to measure the quantities of various goods[ii], and thus the trader's balance became commonly associated with commerce, and thereby found its way into economics, with the balanced scales embodying the concept of equilibrium so beloved by professors of neoclassical orthodoxy. Perhaps in an age of metallic money, prices were determined in this manner, with the fair price being the point where the silver, bronze or copper on one scale balanced the commodity on the other. Whatever the case, the idea of the relation between money and goods being two halves of the scales is one which consciously or subconsciously permeates the thinking of economists and laymen alike.

Underlying this view of the relationship between money and goods are the following assumptions:

1) Money and goods are independent: the supply of one has no bearing on the supply of the other.

2) Money and goods are stocks - i.e. quantities. The price level is simply the relation of one stock to the other - i.e. goods divided by money equals price.

3) Fully flexible prices: there are no upper or lower limits to price.

From this standpoint, an increase in the supply of money *ceteris paribus*, must lead to a rise in price, (since the supply of goods is unaffected), and an increase in the supply of goods, likewise, must lead to a fall in prices, (since the supply of money is unchanged). Unsold goods would be an impossibility in this view - as would forced savings, (money unintentionally unspent).

It is important to note that this conception of the relation between money and output would not have enjoyed such widespread currency, were it not for the fact that it accurately reflects reality in at least one instance: the relationship between money and assets - most notably, financial assets. The clearest instance of this is in the functioning of a stock market.

In a stock exchange, the quantity of shares available is, for all practical purposes, fixed: new share issues are uncommon, and the shares of new firms are usually sold through IPOs (**I**nitial **P**ublic **O**fferings); the bourse deals with second-hand share sales. In this case, the assumptions mentioned above hold, and the relationship between money and assets is exactly as the scales would predict: as money flows into the bourse, share prices rise, (and hence, indices of share prices like the FTSE, DAX, Nikkei, etc... increase) and if money flows out, share prices fall. A similar relationship exists in the real estate market, since here as well, quantity tends to be fixed in the short run, (although the situation in the medium and long term is different).

Hence, we may express the relationship in terms of the following equation:

$$P = M/Q$$

where **P** is the price level, **M** is the money stock, and **Q** is the quantity of assets. Hence:

$$\frac{dP}{dt} = \frac{dM}{dt} - \frac{dQ}{dt}$$ which may be rewritten as **Δp = Δm - Δq**

where **p**, **m** and **q** represent the flow of prices, money and goods respectively.

If we define inflation as a continuous rise in prices, (i.e. Δp > 0 over a period of time), then any increase in the money stock that surpasses an increase in the quantity of assets will result in such a rise, once prolonged.

More generally, if any of these three values is fixed, the other two move in a simple direct or inverse relationship. Hence, if the money stock is constant, prices move in the opposite direction to changes in quantity; if prices are fixed, changes in the amount of money result in parallel changes in the quantity of goods; and if quantity is fixed, then prices and money move in the same direction. Mathematically:

$$\text{If } \boldsymbol{\Delta m = 0}, \boldsymbol{\Delta p = - \Delta q}$$
$$\text{If } \boldsymbol{\Delta p = 0}, \boldsymbol{\Delta q = \Delta m}$$
$$\text{If } \boldsymbol{\Delta q = 0}, \boldsymbol{\Delta p = \Delta m}$$

One question that immediately arises in this context, is whether money cannot be reused, thereby enabling a small stock of currency to facilitate multiple transactions, thereby rendering the relationship $\Delta p = \Delta m - \Delta q$ invalid, since a new entity, the velocity of circulation of money, has to be incorporated into the equation.

That money can be used again and again for numerous transactions is obvious. But the reuse of money cannot change the price level, as is evident from the following example:

Let us suppose there exists one unit of currency (say one yen) and one unit of output. Clearly the price is ¥1 per unit. Following a transaction, if one yen is used again, all that happens is that the unit of output changes hands again at the same price.

It may be argued that the one yen can be used to purchase a second unit of output, at a price of ¥1, thus keeping prices up. Yet consider the matter in greater depth. How many units are for sale? If two, then each is bound to be priced at ¥0.5, otherwise one will go unsold. If one has already been sold, then only one unit is for sale, and the price, therefore, is ¥1. Either way, the relationship $\Delta p = \Delta m - \Delta q$ holds.

To sum up: *in a market, at any given point in time, the total quantity of goods sold multiplied by the average price must equal the total amount of money spent*.

$$\mathbf{PQ = M}$$

III.) From the Velocity of Circulation to the Fraction of Liquidation.

Having dispensed with the view that an increased velocity of circulation can send prices higher, or even keep them higher than they would otherwise be, it is necessary to consider the possible impact of this velocity on quantity.

From the outset, it is evident that a set of second-hand goods can circulate endlessly with a fixed sum of money, provided the money is never saved or otherwise withdrawn from circulation. The velocity of circulation - as a measure of how fast these transactions occur, or more precisely, how many take place in a given time, enables us to determine the total value of transactions that occurs over a given period of time. Hence:

$$MV = T, \text{ (and thus } T = M/V).$$

where **T** is the value of transactions, **M** is the money stock and **V** is the velocity of circulation.

The key point to note is that increases in either the money stock or the velocity of circulation lead to an increase in the (nominal) value of transactions. The value of transactions for its part is comprised of the volume of transactions times the average value of each transaction, and with the latter having an upper limit set by the money stock, increases in the velocity of circulation reflect increases in the former.

The situation is more complicated with first-hand (i.e. new) goods. These goods, unlike second-hand goods have costs which need to be paid for in order for production to continue[iii]. This sets a lower limit on prices - they cannot fall below costs, without imperilling a producer. (Of course, once a producer has covered his costs, he can sell the remaining units in stock at much lower prices, since all additional sales are profitable to him.) Money that is received as payment of costs is sequestered: it does not re-enter circulation except alongside the generation of new output, and thus costs.

An example should clarify this point. Let us suppose a merchant brings ¥1000 worth of goods to a bazaar, and needs to pay his suppliers ¥700, (i.e. his costs are 700 yen). He sells everything and therefore receives ¥1000, thus earning a profit of ¥300. Let us suppose he spends his profits entirely on goods from a single trader, who in turn, needs to pay his importers ¥210, and thus earns a profit of ¥90 - and the trader, unlike the merchant, decides to save his profits.

Only a thousand yen has entered into circulation here. It has purchased goods whose combined prices are ¥1,300[iv], (¥1000 + ¥ 300), but it has only liquidated ¥910 worth of costs, (¥700 + ¥210). Furthermore, it can never liquidate more than its equivalent amount in costs, for the simple reason that once used for this purpose, money does not re-enter circulation except alongside the generation of new costs. To put it differently, costs are the fuel of production that must be replenished if it is to continue, and therefore, unlike profits, cannot be used to light a fire somewhere else. Mathematically:

$$m \geq c$$

where **m** is the money supply[v] (*the part of the money stock that enters a market*), and **c** is the total cost of goods sold in a market, and the former is always greater or equal to the latter. The ration **c/m** is the fraction of liquidation - the proportion of the money supply used to keep production running.

It follows that we can no longer apply the simple scalar model to understanding relationship between the money supply and the flow of output, since the production of the latter depends on the extent to which the former enables producers to recoup their costs and continue their operations. A new metaphor is therefore required, one which incorporates the inter-relation between two flows.

IV.) The Dam: The Dynamic Conception of the Economy.

Just as the scales serve as a representation of the relation between two separate stocks, the dam provides us with a representation of two connected flows. A typical run-of-river hydroelectric dam[vi], which uses a flow of water to generate a flow of electricity, may serve quite well as a metaphor for an economy that converts a flow of money into a flow of goods and services. This analogy has considerable scope for development.

A hydroelectric dam requires a certain minimum flow of water in order to generate any power whatsoever - and it also has a limit beyond which the flow will begin to damage it. Furthermore, a flow of muddy water will lead to the build up of sediment, impairing the dam's functioning, and possibly necessitating a temporary shutting down of operations.

Having already likened the flow of water to the flow of money, and the flow of electricity to the flow of goods and services, we can draw further parallels.

1) The dam represents the productive capacity of the economy - its ability to generate output in response to monetary input.

2) The minimum flow of money is the amount required to liquidate sufficient costs to maintain production at the present level, while the other limit is the maximum flow of money an economy can absorb before undesirable phenomena (asset bubbles, shortages) develop.

3) The flow of debt-money (money that enters existence as a loan) is akin to a muddy river for the growing burden of debt-repayments and interest payments hinder the operation of an economy just as a build-up of sediment undermines the operation of a dam.

According to this dynamic conception of the economy, the effect of an increase in the money supply on prices and output will depend on:

I) The nature of the increase - whether the increase takes the form of clear water (debt-free money) or muddy water (debt-money).

II) The size of the dam.

III) The capacity utilisation of the dam, (in other words, current production in relation to maximum production).

Where the dam is huge and is not operating near full capacity, a fresh stream of debt-free money will lead to greater output rather than higher prices. An additional benefit is that the fresh water may wash out some of the accumulated sediment (debts paid off with debt-free money), thereby improving the functioning of the entire system.

Of course, since not all the money in an economy serves to liquidate costs, just as not all the water in a territory flows down the local river, a fraction of liquidation is needed to properly define the relation:

$$\mathit{f}\mathbf{m} = \mathbf{c}$$

where f is the fraction of liquidation, $\mathbf{m}$ is the money supply and $\mathbf{c}$ is the costs liquidated. If we consider c_{min} to be minimum costs that must be liquidated for production to continue as before, (akin to the minimum flow for the dam to function), then we can see that the minimum amount of money (m_{min}) an economy requires is:

$$\mathbf{m_{min}} = \mathbf{c_{min}} \div \mathit{f}$$

It stands to reason that if the money supply falls below m_{min}, recession ensues. It should also be noted that since f cannot be more than one and is usually less, the flow of money will usually need to be greater than the flow of costs for an economy to function properly.

The costs of production can be divided into two categories - those that constitute incomes (such as wages, salaries, bonuses, etc..) and those that do not, (such as debt-repayment, depreciation, etc...) Following Major Douglas, we categorize the former as **a** payments and the latter as **b** payments, and thus:

$$c = a + b$$

The money supply, for its part, may be said to be composed of incomes that are spent, **(1-s)a**, and new money, **n**. Thus, we have:

$$m = (1-s)a + n$$

where s is the savings rate. Hence, the equation $fm=c$ can be rewritten as:

$$f[(1-s)a + n] = a + b$$

Elementary algebraical operations give us:

$$(1-s)a + n = (a + b)/f$$
$$n = (a + b)/f - (1-s)a$$
$$n = (a + b - fa + sfa)/f$$
$$n = [(1+sf - f)a + b]/f$$

Given that the fraction of liquidation cannot be greater than one, and is typically less, then the absolute minimum amount of new money that an economy requires if it is to liquidate its total costs is equal to the **b** costs. Furthermore, the higher the savings rate, the lower the fraction of liquidation and the greater the level of non-income payments (ex: the more capital-intensive production is), the greater the volume of new money needed to avert a recession.

Trade surpluses are one source of such new money, but of course, it is not possible for every country to run a trade surplus, let alone one large enough to provide a sufficient volume of **n**. At best, they enable one country to liquidate its costs at the expense of another.

Another, more significant, source - is borrowing - i.e. personal, commercial and national debt: but since debt repayments are a component of non-income costs, more loans today entail more borrowing tomorrow, (unless a country manages to improve its trade balance in the meantime- which amounts to shifting the problem to another place). A third is foreign investment - which is either money being borrowed overseas (with the effect being akin to a trade surplus, except that it also entails a future outflow for debt repayments), foreign savings being invested (which again entails a future outflow for repayment), or domestic borrowing by foreign corporations. In short, these options simply shift the problem from the present to the future.

With the exercise of the State's coinage sovereignty, it becomes possible to liquidate costs here and now - i.e. solving the problem of cost liquidation rather than shifting it, through the simple expedient of *creating new money*.

V.) Conclusion: The Reservoir

The idea that money is not just a means of allocating production, but actually facilitates it, is not new. As one monetary reformer of the late 19th century noted:

> 'We carry on our business enterprises until the money gives out ; but the limit should be labor and material. How the discoveries of gold in Australia and California in 1847 stimulated the world's industries !! And yet the basic factors of that industry existed before these gold discoveries.'[vii]

Closely related to this is the observation that modern economies operate considerably below their full capacity. Writing at the end of the First World War, Thorstein Veblen noted:

> 'It may be conceded that production in the essential industries, under pressure of the war needs, rises to something like a 50 percent efficiency. At the same time it is presumably well within the mark to say that this current output in these essential industries will amount to something like twice their ordinary output in time of peace and business as usual, One−half of 50 percent is 25 percent; and so one comes in sight of the provisional conclusion that under ordinary conditions of businesslike management the habitual net production is fairly to be rated at something like one−fourth of the industrial community's productive capacity; presumably under that figure rather than over.'[viii]

The prevalence of the scales metaphor and its underlying assumptions (most notably that money and output are independent, and therefore raising the money supply invariably entails rising prices) has prevented the appreciation and application of these insights. The dam metaphor not only facilitates an understanding of them, but enables us to identify and address the main challenge of the modern economy: ensuring an adequate money supply.

Civil engineers tackled the problem of a variable flow of water to hydroelectric dams through the creation of reservoirs, thereby ensuring a sufficient flow to generate adequate power. A similar solution can be applied in the economic sphere: the creation of a reservoir of debt free money - as a national dividend, a national discount, or indeed, both - to ensure a steady flow of money so that consumption (and therefore production) is not hampered by a lack of funds.

There is one major difference, however, between our metaphorical dam and hydroelectric dams in the real world: barring wars, pandemics and other disasters, the metaphorical dam is always growing - and its limits increasing accordingly. In other words, the economy's productive capacity - thanks to technical progress and other such factors - is constantly increasing, and consequently, so are its minimum and maximum limits. The implication is that it requires more and more money in order to continue functioning - and its ability to safely absorb a larger flow of money is also rising.

Whether that increased inflow takes the form of loans or free money, will, in the final analysis, determine whether mankind will end up submerged in a deepening ocean of debt-slavery - or ascend ever higher in an atmosphere of financial freedom.

i   L. Robbins, quoted in W. Lazonick's *Business Enterprise and the Myth of the Market Economy*, page 68. A devastating critique of this dubious 'science' is provided by John Ruskin in *Unto This Last*.

ii   Though speaking about goods, the analysis here is equally applicable to services, except for the fact that services obviously cannot be weighed.

iii   The production costs of second hand goods are already paid for. We assume that any additional costs in their subsequent marketing and exchange are negligible.

iv   It might be argued that this violates our earlier contention that $PQ = M$, but it does not since that formula applies to a market at a single point in time, and in this case, we are dealing with not one, but two transactions. In each transaction, the equation $PQ=M$ holds: in the first case a thousand yen buys goods whose total prices are 1000 yen, and in the second, three hundred yen buys goods whose total prices are 300 yen. .

v   As soon as we move from the scales towards the dam metaphor, we employ the term 'money supply' as opposed to 'money stock'. This is because in the scales metaphor, it is typically assumed (rightly or wrongly) that the entirety of the money stock enters the market, whereas in the dam metaphor, we acknowledge that only part of the money stock circulates in the economy - and this part is the money supply. It is, of course, possible to reject the assumption in the scales metaphor, in which case the term 'money supply' would be used in that context as well.

vi   Sources:
1) 'Run of River Power'
http://energybc.ca/runofriver.html
2) 'Sedimentation Management in Hydro Reservoirs'
http://www.hydrocoop.org/sedimentation-management-in-hydro-reservoirs/

vii   William A. Whittick, quoted in A. Kitson, *The Money Problem*, chapter 8. The book may be found online at:
http://www.yamaguchy.com/library/kitson/kitson_index.html

viii   Thorstein Veblen, *The Vested Interests and the Common Man*, page 27. Veblen's reason for considering the real figure to be below 25% rather than above it, is based on the views of industrial engineers, as indicated on page 26 of the aforementioned work. Major Douglas also draws attention to this point in *Credit Power and Democracy*.