**neutrality of money**

‘Neutrality of money’ is a shorthand expression for the basic quantity-theory proposition that it is only the level of prices in an economy, and not the level of its real outputs, that is affected by the quantity of money which circulates in it. Thus the notion – though not the term – goes back to early statements of the quantity theory, such as the classic one by David Hume in his 1752 essays ‘Of Money’, ‘Of Interest’ and ‘Of the Balance of Trade’. At that time the notion also served as one of the arguments against the mercantilist doctrine that the wealth of a nation was to be measured by the quantity of gold (which in 18th-century England constituted a – if not the – major form of metallic money: Feaveryear, 1963, p. 158) that it possessed. The term itself is much more recent. Though attributed by Hayek (1935, pp. 129–31) to Wicksell, it is actually due to continental economists in the late 1920s and early 1930s to whom Hayek also refers (see 1935, pp. 129–31; see also Patinkin and Steiger, 1988).

1. The rigorous demonstration of the neutrality of money is based on the critical assumption that individuals are free of ‘money illusion’. An individual is said to suffer from such an illusion if he changes his economic behaviour when a currency conversion takes place: when, for example (as in Israel in 1985), a new monetary unit – the ‘new shekel’ – is introduced in circulation and declared to be equivalent to 1,000 old shekels.

It can be shown (Patinkin, 1965) that an illusion-free individual in an economy with borrowing who maximizes utility subject to his budget constraint will have demand functions which depend on relative prices, the rate of interest, and the real value of his initial wealth – which consists of physical capital, bond holdings, and money balances. That is, the demand of this representative individual for the $j$th good, $d_j$, is described by the function

$$d_j = f_j(p_1/p, \ldots, p_{n-2}/p, r, K_0 + B_0/p + M_0/p)(j = 1, \ldots, n - 2),$$

where the $p_j$ are the respective money (or absolute) prices of the $n - 2$ goods; $p$ is the average price level as defined by $p = \sum w_j p_j$ where the $w_j$ are fixed weights; $r$ is the rate of interest; $K_0$ is physical capital, $B_0$ is the initial nominal value of bond holdings (which, for a debtor, is negative), and $M_0$ is the initial quantity of money. Thus when the new shekel is introduced in circulation, the price of each good in terms of this shekel (and hence the general price level), the terms of indebtedness, and the nominal quantity of initial money holdings are respectively reduced to 1/1,000th of what they were before; hence relative prices and the real value of initial wealth are unaffected; hence so are the amounts demanded of each good.

Mathematically, the foregoing property of the demand functions is described by the statement that these functions are homogeneous of degree zero in the money prices and in the initial quantity of financial assets, including money. Accordingly, the
absence of money illusion is sometimes referred to as the homogeneity property of the demand functions. (For the necessary and sufficient conditions that must be satisfied by the utility function in order to generate such illusion-free demand functions, see Howitt and Patinkin, 1980.) This homogeneity property is to be sharply distinguished from what the earlier literature denoted as the ‘homogeneity postulate’, by which it meant the invariance of demand functions with respect to an equiproportionate change in money prices alone, and which invariance it erroneously regarded as the condition for the absence of money illusion and hence for the neutrality of money (Leontief, 1936, p. 192; Modigliani, 1944, pp. 214–15): for even in the case of an individual who is neither debtor nor creditor, such a change affects the real value of his initial money balances, hence is not analogous to a change in the monetary unit, and hence – by virtue of the real-balance effect – will generally lead him to change the amounts he demands of the various goods.

For a closed economy, the aggregate value of $B_0$ is obviously zero, for to each creditor there corresponds a debtor. For simplicity, we can also consider the amount of physical capital, $K_0$, to remain constant. Disregarding distribution effects, the demand functions of the economy as a whole for the $n/2$ goods can then be represented by

$$D_j = F_j(p_1/p, \ldots, p_{n-2}/p, r, M_0/p)(j = 1, \ldots, n - 2)$$

and the corresponding supply functions by

$$S_j = G_j(p_1/p, \ldots, p_{n-2}/p, r).$$

The general-equilibrium system of the economy is then

$$F_1(p_1/p, \ldots, p_{n-2}/p, r, M_0/p) = G_1(p_1/p, \ldots, p_{n-2}/p, r)$$

$$\vdots$$

$$F_{n-2}(p_1/p, \ldots, p_{n-2}/p, r, M_0/p) = G_{n-2}(p_1/p, \ldots, p_{n-2}/p, r)$$

$$F_{n-1}(p_1/p, \ldots, p_{n-2}/p, r, M_0/p) = 0$$

$$F_n(p_1/p, \ldots, p_{n-2}/p, r, M_0/p) = M_0/p.$$

The $(n - 1)$st equation is for real bond holdings, whose aggregate net value is (as already noted) zero; and the $n$th equation is for real money balances. Assume that this system has a unique equilibrium solution with money prices $p_1^0, \ldots, p_{n-2}^0, p_0$ and the rate of interest $r_0$, and that the economy is initially at this position. Let the quantity of money now be changed to $kM_0$, where $k$ is some positive constant. From the preceding system of equations we can immediately see that (on the further assumption that the system is stable) the economy will reach a new equilibrium position with money prices $kp_1^0, \ldots, kp_{n-2}^0, kp_0$ and an unchanged rate of interest $r_0$. (Clearly, this conclusion would continue to hold if the supply functions $G_j(\cdot)$ were also dependent on $M_0/p$.) Thus the increased quantity of money does not affect any of the real variables of the system, namely, relative prices, the rate of interest, the real value of money balances, and hence the respective outputs of the $n-2$ goods. In brief, money is neutral: or in