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"THE CLASSICAL DICHOTOMY IN THE WALRASIAN SYSTEM: A CRITICAL EXAMINATION"

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Abstract

Walras' general equilibrium model with money is presented and the allegation that it retains the classical invalid dichotomy is re examined. It is shown that, although mathematically incorrect, the model retains the properties of a consistent system and a slight modification makes it determinate without changing its basic features. In fact Walras' model is shown to be equivalent to the standard neoclassical general equilibrium model with money as developed mainly by Patinkin.

1. Introduction

The scope of this paper is to try to explore the groping towards the establishment of a Walrasian monetary general equilibrium and at the same time to examine some of the properties of this equilibrium and its critiques by a number of economists. Our main concern will focus on the question of whether or not Walras in trying to establish his general equilibrium system retained the so - called classical invalid dichotomy '. If he did, his whole general equilibrium framework breaks down because money is not integrated with the theory of value and the level of money prices is indeterminate. We will however abstract from criticizing Walras' monetary theory in the light of recent developments. Such a critique is given in Howitt (1973).

The classical dichotomy was explicit or implicit in the writings of principal neoclassical writers as Cassel, Fisher, Divisia, Marshall, Pigou and Walras according to Patinkin[2]. This dichotomy is invalid since these writers assume that the real part of a general equilibrium system determines the relative prices of commodities and then an equation of the form MV = PQ determines the absolute price level. It can be seen that in such a case the excess demand for money is identically equal to zero and the level of money prices is therefore indeterminate. More formally, the excess demand functions of the real part of the system are homogeneous of degree zero in prices, whereas the equation MV = PQ is not even a homogeneous equation[3]. Hence there is no version of Walras law to relate the two parts, the real and the monetary, the system is completely decomposable and the money prices are indeterminate.

The first part of the paper deals with the Walrasian system as it is presented in the "Elements" and Patinkin's critique will be examined. It will be seen that Walras' system, though mathematically incorrect, retains the properties of a valid system, for the crucial reason that all the demand functions for commodities and money are derived from the principle of utility maximization. So Patinkin's critique does not apply in this case[4]. In the second part of the paper, Walras' system will be modified so as to be mathematically correct and determinate, retaining at the same time all of its basic elements. Finally some conclusions will be drawn, especially on the reversion of Walras' procedure in deriving the demand function for money from utility maximization in the fourth edition of the "Elements"[5].

2. Walras' system

In presenting Walras' system we will retain at this stage his notation, so that Patingkin's critique will be more apparent[6]. Walras starts his analysis by considering commodities in existence of all sorts like final products, raw materials and capital in the form of land, personal or human capital and capital proper designated by (A), (B), (C), ... (M), ... (T), (R), (K) and services of availabilities of the commodities (A), (B), ... (M) designated by (A′), (B′), (C′)... which are considered by Walras as circulating capital goods. Then the prices of all the commodities and capital goods in terms of commodity (A), will be 1, p_b, p_c, ... p_t, p_p, p_k... and $p'_a = i$, $p_b = p_b\, i$,..., $\pi_p = p_p\, i$, $\pi_k = p_k\, i$, ..., will be the prices of the services of availabilities of these commodities and capital goods[7]. Furthermore Walras assumes the existence of money (U), which as Marget (1935) indicates, has a physical existence and is not an abstract unit of account. Its own price in terms of numeraire (A) is p_u and the price for its service of availability is $p_{u'} = p_u\, i$[8]. Then Walras assuming that each individual has initial endowments of goods (A), (B), (C), ..., and of money, derives with his usual procedure (i.e., from utility maximization), the demands for the services of availability of all goods and of the ficticious commodity (E), which is nothing else but an imaginary commodity consisting of perpetual net income with price $p_e = \frac{1}{i}$. It does not have any real existence and it is neither bonds as Morishima (1977) claims, nor securities according to Kuenne (1963). Of course it can be either in a general equilibrium system, but it is not what Walras had in mind. Commodity (E) is the total sum of the values of the services of availability of heterogeneous capital goods.

This is easily recognized in Walras' theory of capital formation and credit where Wlaras assumes that an individual derives utility from commodity (E) and possesses a certain quantity of (E) which is $q_e = q_t p_t + \ldots + q_p \pi_p + q_k \pi_k + q_{k'} \pi_k$ where q_t, q_p, q_k, $q_{k'} \ldots$ are quantities of landed capital, personal (human) capital and quantities of various kinds of capital goods and $p_{t,}$ π_p, π_k, $\pi_{k'}$, are flows of net incomes (rental rates) which are generated by the use of the services of availability of land, labour and various heterogeneous capital goods[9].

As far as money is concerned, Walras assumes that individuals demand money for the purchase of commodities (A), (B), (C), ... (E). So he splits money up into different components as α, β, ..., ε which respresent quantities of goods demanded in the form of money. Each component represents demand for money for the purchase of a particular good and commodity (E). Then assuming that these quantities give the individual a certain amount of utility, he derives the demand functions for these quantities from utility maximization. In other words he writes:

$$\alpha = f_\alpha(\ldots)$$

$$\beta = f_\beta(\ldots)$$

$$\vdots$$

$$\varepsilon = f_\varepsilon(\ldots)$$

where f(...) is money demand function for the purchase of a given commodity[10]. Then by multiplying each one of them by its respective price and dividing by the price of the service of money, he gets the total desired demand for the service of money; i.e.,

$$\frac{\alpha p_{a'} + \beta p_{b'}, + \ldots + \varepsilon p_{a'}}{p_{u'}}$$

First we must note that the introduction of money into the utility function is at a first glance, completely arbitrary and without any justification. It can be seen that in such an economy as the one described by Walras, there is no need for individuals to hold money, since there is no uncertainty in his model[11]. The only justification for putting money into the utility function would be the lack of synchronization between receipts and payments when transactions take place. But Walras assumes fixed dates for receipts and payments so that the introduction of money into the utility function seems completely arbitary. The only justification given by Walras for including money balances into the utility function is that he regards money as a circulating capital good which yields services of availability. Since he assumes that all capital goods yield some utility he considered it very natural to include in it the money balances.

Furthermore, as Morishima (1977, p. 153) points out, the demand for money in Walras' system is actually related to the theory of portfolio selection and inventory investment where individuals have the choice between services of availability of capital goods and services of availability of money. Besides that, individuals have to keep their savings in the form of money in order to be able to buy the heterogeneous capital goods which are diguised in a compact way into commodity (E). So they must hold money even if there are fixed dates for payments and receipts and no uncertainty.

Secondly Walras inserts the components $\alpha, \beta, \ldots \varepsilon$ into the utility function which themselves represent money holdings for the purchase of commodities (A) (B)... (E). A crucial question arises here: Why didn't he put into the utility function a total quantity of money, say M, instead of spliting it up into different compnents? The reason for this will become clear below.

Walras assumes that individuals keep the quantities α, β, ... ε in the form of money. How much money should they keep? Obviously as much as it is needed for transactions and savings. This is indicated by the equation

$$o_u = q_u - \frac{\alpha p_{a'} + \beta p_{b'} + \ldots + \varepsilon p_{a'}}{p_{u'}}$$

or in the aggregate for all individuals[12],

$$O_u = Q_u - \frac{d_\alpha p_{a'} + d_\beta p_{b'} + \ldots + d_\varepsilon p_{a'}}{p_u} \qquad (1)$$

where d_a stands for the aggregate demand of commodity (A) in the form of money by all individuals and Q_u is the aggregate supply (endowments) of money. Hence Q_u stands for the aggregate excess supply of the service of money.

It is now clear enough from the way that he writes the demand function for money in a form of separate functions that his main purpose was to derive the cash balance equation (1). This is also very clear from p. 317 of the "Elements".

This is of cource the theoretical solution which Walras formulated mathematically and then as usual he passes on to the practical solution which is reached in the market by his familiar concept of tatonnement. He then uses the same procedure he used in his theory of production and capital formation, to establish the equilibrium of his system. In discussing the solution of his system, Walras counts equation (1) together with the rest equations of his system[13], but he points out that equation (1) remains outside the solution, since if equilibrium is established everywhere, then there is no need for a tatonnement to take place on this equation. This is a clear evidence that Walras was aware of Walras law although Morishima insists on the opposite[14]. Hence equation (1) can be ruled out by Walras law. Continuing his analysis, Walras aggregates the demand for money by consumers, by firms and demand for money for the purpose of savings and he gets the equation of monetary circulation[15],

$$Q_u = \frac{H_\alpha}{p_{u'}} \tag{2}$$

which is the equilibrium condition, money supply equal to money demand. In the case where money is the numeraire, the above equation of monetary circulation establishes the inverse relationship between changes in the stock of money and the rate of interest $i \equiv p_{u'}$. We must note that Walras was careful in noting that when $p_{u'}$ changes, this will affect the real part of the system, althought this dependence of the real part of the system upon $p_{u'}$, "is very indirect and very weak"[16]. In other words the demand function for money (although in separate form) is related to the real part of the system and the whole system is not decomposable. So Walras concludes that:

> That being the case the equation of monetary circulation when money is not a commodity, comes very close, in reality, to falling outside the system of equations of general economic equilibrium. If we first suppose general equilibrium to be established then the equation of monetary circulation would be solved almost without any groping simply by raising or lowering $p_{u'}$ according as $Q_u \gtrless \frac{H_\alpha}{p_u}$ at a price $p_{u'}$ which had been cried at random. If, however this increase or decrease in $p_{u'}$ were to change H_α ever so slightly, it would only be necessary to continue the general process of adjustment by groping in order to be sure of reaching equilibrium. This is what actually takes place in the money market[17].

What about Patinkin's critique? Patinkin uses mainly the above passage from Walras to point out the following:

> More specifically assume that the economy as a whole is in equilibrium at a certain level of prices. Let now be an arbitrary change in $p_{u'}$, *and let us assume that this does not react back on the other markets.* Then those markets are still in equilibrium. Hence by Walras law, so is the money market. Thus no market forces are created anywhere in the system to force $p_{u'}$ back to its original level. It follows that the equilibrium level of p_u, is indeterminate. By the last

> paragraph of the passage just cited above so then is the level of $p_u\cdot$. Thus if Walras' assumptions are carried to their extreme - and he certainly shows no objection in principle to have this done - they imply the indeterminacy of money prices and hence the impossibility of all monetary theory[18].

We must point out that, as it is clear from the previous quotation from the "Elements", Walras never assumed that a change in $p_u\cdot$, does not react back on the real part of the system. Hence there is no reason why we should assume as Patinkin does, that such a change does not react back on the system. The term $p_u\cdot$, appears in the budget constraint of the individuals and this will affect the real part of the system in any case. In other words Walras' system is not decomposable. Hence Patinkin's critique can not be correct and the level of money prices is not indeterminate as he insists. One of the main defects in Patinkin's critique, is that he takes into account only the exchange part of Walras' system leaving outside the theories of production and capital formation, something that has been recently noticed by Morishima (1977). Although Walras' system is very complex and mathematically incorrect[19], it retains the properties of a determinate system if it is modifed in some way.

3. Walras' system modified

In modifying Walras' system, we will retain all of its basic elements, taking into account both the theory of production and capital formation as they appear in the "Elements". However we will differ from Walras in two points. First we will not treat money as a capital good needed for production. Second, the demand for the imaginary commodity (E) will be stated explicity as demand for all (and every) capital good. These changes, although they do not alter Walras' system in any serious way, they however simplify our exposition. Furthermore some weaker assumptions will be made, such as the ordinal character of the utility function. The version of the system we will present, draws on Samuelson's illuminating paper[20].

Following Walras we present the equations of production and capital formation, as follows: Let a_{ij} be the demand of input i required in the production of good j. Similarly b_{ir} denotes the amount of input i for the production of the new capital good r. These coefficinets are assumed to be given constants. If there are m goods denoted by X, n factors of production denoted by K and l new capital goods denoted by K′, we have the following set of equations:

$$\sum_{j=1}^{m} a_{ij} X_j + \sum_{r=1}^{l} b_{ir} K' = K_i \qquad i = 1, 2, \ldots, n \tag{1}$$

$$\sum_{i=1}^{n} a_{ij} W_i = P_j \qquad j = 1, 2, \ldots, m \tag{2}$$

$$\sum_{i=1}^{n} b_{ir} W_i = \pi_r \qquad r = 1, 2, \ldots, l \tag{3}$$

where P_j, π_r and W_i are the prices of goods, the prices of (new) capital goods and the rewards of factors of production respectively, in terms of the nth capital good, which is taken as numeraire. Labour is assumed to be the first capital good.

Equations (1) represent the condition that the demand for each factor of production must be equal to its supply. Equations (2) state that the average cost in the production of a good must be equal to the price of that good and equations (3) state that the average cost in the production of a new capital good must be equal to its price. Furthermore we have an equation representing the equality of savings and investment in terms of numeraire and the equations of capitalization of the new capital goods. These are:

$$S = \sum_{r=1}^{l} \pi_r K_r' \tag{4}$$

$$\pi_i = \frac{W_i}{r} \qquad i = 1, 2, \ldots, l \tag{5}$$

where S and r stand for savings and the "rate of net income" in Walras' terminology respectively. Our equations (1), .., (5) correspond exactly to those in the "Elements" (pp. 280 – 81). For simplicity we don't take into account the depreciation cost and the insurance premium in the capitalization equations. Furthermore we must note that there are at least two non – produced factors; i.e., labour and land, so that the condition $n > l + 1$ must always hold. This condition does not allow us to resort to an immediate (valid) dichotomy using the non – substitution theorem as Negishi does[21].

Although in Walras' system there is no joint production and production takes place under constant returns, there are however two non – produced factors, so that the non – substitution theorem is not applicable in this case.

To complete the system of general equilibrium, we require the demand functions for goods and the supply functions of the factors. These can be derived from the principle of utility maximization. What about the demand function for money? This can also be derived from utility maximization, bearing in mind that money is a circulating capital good in Walras' system and hence it yields services of availability.

Following Samuelson, we write the utility function for a representative individual as follows:

$$U = U(X, K', M; P, W_1, \pi_2, \ldots, \pi_n, p_m)$$

where X, K′, P stand for the vectors of goods, new capital goods and prices of goods respectively. M stands for money, W_1 for the wage rate, $\pi_2, \ldots, \pi_n$ for the prices of capital goods and p_m for the price of money.

All prices are in terms of the nth capital good. Variables to the right of the semicolon are treated as parameters. The utility function is assumed to be homogeneous of degree zero in all prices and M. It is clear that the above formulation of the utility function, is an alternative form to that used by Patinkin (1965).

Hence the representative individual's problem is:

$$\underset{X,\,K,\,M}{\text{Max}}\ U(X, K', M; P, W_1, \pi_2, \ldots, \pi_n, p_m)$$

subject to,

$$\sum_{i=1}^{m} p_i X_i + \sum_{j=2}^{n} \pi_j K_j' + W_1 K_1 + p_m r M = r \sum_{i=1}^{m} P_i \bar{X}_i + r \sum_{j=2}^{n} \pi_j \bar{K}_j + W_1 \bar{K}_1 + r p_m \bar{M}$$

where bars denote endowments of the individuals. We nust note that now Kj represents the total amount of labour time available and Kj the amount of leisure demanded by the individual. With the only exception the form of the utility function, the above problem is exactly that which appears in the "Elements". The budget constraint is identical to that used by Walras. However in our budget constraint there is no demand for the imaginary commodity (E). But this demand is identically equal to the demand for heterogeneous capital goods, as can be seen from the budget constraint in p. 320 of the "Elements"[22]. Hence both systems have a unique resemblance and are indeed equivalent.

The above maximization yields demand functions for goods, capital goods and money which can be derived using the budget constraint and the following first order conditions:

$$\frac{\partial U/\partial X_i}{P_i} = \frac{\partial U/\partial K_j'}{\pi_j} = \frac{\partial U/\partial K_1}{W_1} = \frac{\partial U/\partial M}{p_m^r} \qquad i=1, \ldots, m \quad j=2, \ldots, n \qquad (6)$$

How the quantities of all commodities and their money prices are determined in this system? It can be seen that if we add to the above system of equations the following set of equations, we have a complete and determined system of general equilibrium. The equations that we will add are the equations of capitalization for the existing capital goods and the equation which states that total money demanded must be equal to total money supplied, which is exogenously given. So we have:

$$\pi_i = \frac{W_i}{r} \qquad i=2, 3, \ldots, n \qquad (7)$$

$$M = \bar{M} \qquad (8)$$

where we have dropped the equation for the capitalization of labour.

Counting equations and unknows, we see that, ignoring equation (4), there are $n+m+2l$ equations in (1), (2), (3), and (5), and $2n+m+1$ in (6), (7) and (8) which yield overall $3n+2m+2l+1$ equations. Counting the unknowns we see that these are the $n-2$ prices of capital goods in terms of the nth, the n rental rates (including the wage rate), the n quantities of capital goods, the m prices of goods, the m quantities of these goods, the l prices of new capital goods, the l quantites of new capital goods, the rate of interest and the demand for money, which yield overall $3n+2m+2l$ unknowns. However using the budget constraint we can see that one equation is always dependent upon the others so that we have a system of $3n+2m+2l$ equations in $3n+2m+2l$ unknowns. This system determines all quantites and relative prices in terms of the nth capital good. Once these have been determined, we can divide all prices by $\frac{p_m}{P_n}$ which is the relative price of money in terms of the nth capital good and hence determine the money prices of the system. This is obviously the procedure that Walras followed but in a very narrative and clumsy way indeed.

4. Conclusion

In our opinion it should be clear that Walras' system does not retain the classical invalid dichotomy, although it is far from being self - determined. The above analysis should now explain Patinkin's perplexity for the reversion of Walras' procedure. · Patinkin writes on this matter:

> In all his work before the fourth edition of his "Elements", Walras merely posited his cash balance equation on the basis of considerations which were extraneous to the main body of his arguments. More specifically in contrast with his analysis of every other good, Walras did not derive the demand function for money from utility maximization. Indeed he made no use of marginal utility analysis in his monetary theory except to deal with the case of a money which was also a commodity.

And later on Patinkin writes: "I do not understand the reason for Walras' reversion; nor do I fully understand the analysis itself"[23]. But this reversion was very crucial since this is a right way in order to integrate money into a general equilibrium system and not just to append in a barter system an MV = PQ type equation. As Samuelson (1968, p. 183) points out, "Marget was wrong in considering it a fault of Walras that after his second edition of his "Elements" he dropped a simple MV = PQ equation". Hence Walras' reversion of the whole procedure makes his system more powerful and consistent, though it is far from being mathematically correct. On the other hand the long – run neutrality of money still holds in his sstem and it can be seen that an increase in money balances will tend to increase all money prices proportionally and leave the real part of the system and the rate of interest unchanged[24]. Therefore, although most of the critiques of Patinkin and others[25] of Walrasian monetary theory hold true, their insistence that the dichotomy of Walras' system is invalid is far from being true.

FOOTNOTES

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1. The terminology is due to Patinkin (1965, pp. 174-76). Our main reference for Walras' work will be the "Elements of Pure Economics" (1954), hereafter "Elements".

2. For full references and a historical review, see Valavanis (1955).

3. For details see Patinkin, *op. cit.* and Negishi (1972).

4. See Patinkin, *op. cit.,* Note C.

5. Walras did not derive the demand function for money from utility maximization in the previous editions of his "Elements".

6. For a brief but complete description of Walras' system, see Jaffe (1978).

7. Since all commodities are considered as circulating capital goods, the equations $p_{b'} = p_b\, i$, $\pi_\rho = p_p\, i$,... are simply the capitalization equations, stating that the rate of interest which is the same for all capital goods in equilibrium, is the rental rate over the price of a capital good.

8. Samuelson credits Walras in pointing out the two prices of money, one being the price of money itself and the other being the price of money for its use per unit of time. See Samuelson (1947, p. 120).

Clearly when money is the numeraire then the first price noted above is the inverse of the price level and the second is the rate of interest.

9. Commodity (E) turns out to be a device for the aggregation of the heterogeneous capital goods. For a clear exposition and interpretation of Walras' theory of capital formation, see Drandakis (1966) and Jaffé (1980).

10. Walras was careful in not counting these equations into his general equilibrium system, since in such a case, his system would be overdetermined.

11. See "Elements", pp. 315 – 18 for a description of Walras' economy. However, recent developemnts in monetary theory which emphasize the role of money as a medium of exchange, regard uncertainty as not necessary for the demand for money. In a general monetary equilibrium agents hold commodity stocks which fill any gap between inflows and utflows thus yielding utility. In such a case it can be shown that transactions costs are necessary for the holdings of money. Walras followed exactly this procedure wthout explicitly referring to transactions costs. Hence according to Neihans (1978), Walras was the first who treated money as if it is a consumers or producers good and the first who treated the demand for money as a special case of the demand for inventories. A brief but accurate account on these matters is given in Jaffé (1980).

12. The last term $\frac{\varepsilon p_{a'}}{p_{u'}}$ represents demand for the purpose of savings. In this economy it is assumed that individuals use their savings for the purchase of commodity (E). See "Elements", pp. 267 – 77. Furthermore, Walras is wrong in multiplying ε by $p_{a'}$ instead of multiplying it by 1, which is the net flow of (W) in numeraire terms. See also Patinkin's critique on this matter, *op. cit.*, p. 554.

13. See "Elements" pp. 323 – 24 and Jaffé's note 15, pp. 545 – 6 for a clear description of the equations and unknowns.

14. See Morishima (1977, p. 126). That Walras was aware of Walras Law, can be seen also from the pages 162, 241 and 281 in the "Elements".

15. H_α stands for the aggregate demand for the service of money by all individuals in the economy for transactions, production and savings purposes.

16. "Elements", p. 326.

17. "Elements", pp. 326 – 27. Patinkin is right in observing that the inequalities $Q_u P'_{u'} \gtrless H_\alpha$ should be reversed. See Patinkin, *op. cit.*, p. 560, footnote 63. Walras seems to be confused at this point where he discussed the stability of the system. If equilibrium is reached everywhere in the system, then there is no need for groping in the money market. Hence in the expression "almost without any groping", the word "almost" should be absent.

18. Patinkin (1965, p. 161), italics added.

19. There are some important errors on Walras' procedure and the narrative exposition of his system makes it unrealistic. For a critique on this matter, see Morishima (1977, Ch. 9), who also refers to an important error by Walras pointed out by Yasui.

20. See Samuelson (1968).

21. See Negishi (1972, pp. 260 – 61).

22. In other words the term $p_e d_e$ in Walras' constraint is equivalent to the term $\sum_{j=2}^{n} \pi_j K'_j + W_1 K_1$ in our budget constraint.

23. Patinkin, *op. cit.*, 546 and p. 560 respectively. For a historical review on the reversion of Walras' procedure see Jaffé's writings in the "Elements", p. *601*. In Jaffé's words: "... In both editions 2 and

3 the monetary theory was still not effectively integrated with his general equilibrium theory... When edition 4 of the "Elements" appeared in 1900..., Walras identified cash balances with circulating capital yielding services of availability; and this enabled him to link the value of money to utility functions in the same way that the values of the other categories of circulating capital goods were linked to these functions". We should note that the inclusion of money into the utility function, for whatever reason, is sufficient to make the system determinate. See Hansen (1970).

24. See "Elements", p. 333.

25. For a source of references see Patinkin, *op. cit.* A notable exception is Samuelson who writes: "If Patinkin wishes to say that the principal neoclassical writers (other than Walras) had failed to publish a clear and unambiguous account of the (A, B) equation such as I an doing here, I would agree..." Samuelson (1968, p. 177). See also Samuelson (1972) for similar statements.

REFERENCES

Drandakis, E.M. (1966), "On the competitive equilibrium in a monetary economy", International Economic Review 7, 304-328.

Hansen, B. (1970), A Survey of General Equilibrium Systems (New York: McGraw Hill).

Howitt, P.W. (1973), "Walras and monetary theory". Western Economic Journal 11,487-99.

Jaffe, W. (1978), "Notes on Walras' system", circulated at York University, Department of Economics (unpublished).

...., (1980), "Walras' economics as others see it". Journal of Economic Literature 18, 528-549.

Kuenne, R.E. (1963), The Theory of General Economic Equilibrium (Princeton, N.J.: Princeton).

Marget, A.W. (1935), "Monetary aspects of the Walrasian system", Journal of Political Economy 43, 145-186.

Morishima, M. (1977), Walras' Economics (Cambridge: Cambridge University Press).

Negishi, T. (1972) GeneralEquilibrium Theory and International Trade, (Amsterdam: North Holland).

Niehans, J. (1978), The Theory of Money (Baltimore: The Johns Hopkins University Press).

Patinkin, Don (1965), Money, Interest and Prices, 2nd. ed. (New York: Harper and Row).

Samuelson, P.A. (1965), Foundations of Economic Analysis, (New York: Atheneum).

..., (1968), "What classical and neoclassical monetary theory really was". Canadian Journal of Economics, 1, in Clower, R.W. ed., (1 ?s969) Monetary Theory (Penguin).

..., (1972), "Samuelson on the neoclassical dichotomy: a reply". Canadian Journal of Economics 5, 283-92.

Valavanis, S. (1955), "A Denial of Patinkin's contradiction", Kyklos 4, 351-68.

Walras, L. (1954), Elements of Pure Economics, W. Jaffe tr. (London: Allen and Unwin).