A Note on Tsiang's Interpretation of Robertson's Theory of Interest

by

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The fact that Robertson approved of Tsiang's 1956 analysis of the Robertson/Keynes interest rate controversy [Tsiang, 1980, p. 474n] suggests that by examining Tsiang's view of this controversy it may be possible to gain a better understanding of the fundamental issues that separated Robertson and Keynes. It is argued that Tsiang's methodologies do not provide a mechanism by which it is possible to reconcile Robertson's and Keynes' views of the theory of interest in that, aside from Tsiang's confusion with regard to the relationship between stocks and flows, he misspecified Keynes' the demand for money function in his model. It is demonstrated that when this function is properly specified it becomes clear that it was Robertson and Tsiang who were confused in their understanding of the nature of this controversy, not Keynes.

I. On the Equivalence of Robertson's and Keynes' Views

In 1980 Tsiang [pp. 472-4] argued that the liquidity preference theory can be summarized by the monetary equilibrium condition:

$$(1)\quad M_t^S = L(C_t^P + I_t^P, r_t, \pi_t, W_t, \dots),$$

where $L(C_t^P + I_t^P, r_t, \pi_t, W_t, \dots)$ is Tsiang's interpretation of Keynes' money demand function; C_t^P and I_t^P are current planned consumption and investment expenditures, respectively; I_t^P the current rate of interest; π_t the current expected rate of price inflation; W_t the current value of total wealth; and the dots following these variables indicate an open mind as to other arguments that one might wish introduced into the demand for money function (L). By assuming planned expenditures are always realized (i.e., that $C_t^P = C_t$ and $I_t^P = I_t$ where C_t and I_t are actual consumption and investment expenditures) and that L is linear in planned expenditures Tsiang writes the money demand function L as:

$$(3)\quad L(C^p + I^p, r, \pi_t, W_t, \dots) = k(r, \pi, W, \dots)(C^p + I^p) + \bar{L}(r, \pi, W, \dots).$$

Substituting (3), with appropriate subscripts added, into the expansion of (1) around r_{t-1}, π_{t-1}, W_{t-1}, Tsiang obtains his equation 4a:

(4a) $\Delta M_t^S = k_{t-1} I_t^P - k_{t-1}(Y_{t-1} - C_t^P) + \Delta H_t$,

where, according to Tsiang, $k_{t-1} = k(Y_{t-1}, \pi_{t-1}, W_{t-1}, \ldots)$; Y_{t-1} (=$C_{t-1} + I_{t-1}$) is the income received in the previous period; and ΔH_t represents net hoarding as defined by the sum of the terms in differentials and derivatives that appear as a result of the expansion of (1). Tsiang then argues:

> It can be immediately recognized that (4a) is nothing but the equilibrium condition for the loanable funds market as stipulated by Robertson. $(Y_{t-1} - C_t^P)$ is exactly what he defined as planned saving, which is not what is expected to be saved out of income accruing in the future, but what is planned to be saved out of disposable income (i.e., income received in the preceding period). [Tsiang, 1980, p. 473. (Cf. Robertson, 1940, pp. 2-3, and Tsiang, 1956, p. 548).]

There is, however, a fundamental problem with Tsiang's interpretation of equation (4a) as the equilibrium condition for the loanable funds market as stipulated by Robertson.

a. Tsiang's 1980 Methodology

Since "what is planned to be saved out of . . . income *received* in the preceding period" must have the dimension of a stock (i.e., be measured in units of money), if $Y_{t-1} - C_t^P$ in (4a) is to correspond to what Robertson defined as planned saving, then Y_{t-1} and C_t^P must also have the dimension of a stock, that is, must be measured in the monetary unit—dollars, pounds, etc. But according to Tsiang, the parameter k_{t-1} in his model is "the inverse of the velocity of circulation of active balances" [Tsiang, 1980, p. 474n] and, as such, this parameter must be measured in units of time. Thus, Y_{t-1} and C_t^P cannot be viewed as having the dimension of a stock in Tsiang's model since this would imply that the products that result from multiplying these variables by k_{t-1} in (4a) are measured in units of time *multiplied* by units of money. Such a measure is meaningless within this context.

The only way to make sense out of equation (4a) is to view Y_{t-1}, C_t^P, and I_t^P as having the dimension of a flow (i.e. as being measured in units of money *divided* by units time). But if these variables are viewed in this way Y_{t-1} and C_t^P cannot possibly correspond to what Robertson defined as planned saving. If anything in equation (4a) is to correspond to what Robertson defined as planned saving it must be $k_{t-1}(Y_{t-1} - C_t^P)$ which, of course, does have the correct dimension, but $k_{t-1}(Y_{t-1} - C_t^P)$ is the amount of income planned to be saved in k_{t-1} units of time and is equal to what Robertson defined as planned saving if, and only if, the length of the unit time period in Tsiang's model is equal to k_{t-1} .

Tsiang's failure to appreciate the extent of this problem is indicated by his argument:

> Robertson would further simplify the equilibrium condition (4a) by setting k_{t-1} equal to unity. This simplification can be justified on the ground that the average decision period which we have taken as the unit time period is in fact the average length of the time between the procuring or allocation of a unit of money as the finance for a certain planned expenditure and the time when it becomes ready to be allocated again as finance for new expenditure or as idle balance. It is in fact the full cycle length of circulation of an average unit of the transactions balance. During such a unit time period, k, the inverse of the velocity of circulation of active balance, should be unity.
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> If the new equi1ibriurn interest rate and other current relevant arguments are different from those of the last period so that k_t is different from k_{t-1} this means only that for the start of the next period (i.e., period t + l) the unit decision period has to be adjusted appropriately such that k_t is again equal to unity. [Tsiang, 1980, p. 474n]

This argument seriously misconstrues both the nature of the unit time period in Robertson's model and the relationship between this time period and the velocity of circulation.

Robertson defined the unit time period, which he called a 'day', as "a period of time . . . so short that the income which a man receives on a given day cannot be allocated during its course to any particular use," [Robertson, 1933, p. 399] and he insisted that this time period "is the minimum period that *can* elapse between receipt of income and its expenditure," that is, "it is the interval between receipt of income and its disposal—disposal consisting *either* of expenditure or of adding to balances."[1] [Robertson, 1933, p. 711] In addition, Robertson was quite explicit as to the implied relationship between the unit time period and the velocity of circulation: [2]

> The 'day' is, by definition, quite a different entity from the period of circulation of money against income, which quite certainly in real life is many 'days' long. The 'day' is an atomic unit of time: income may be different on one ‘day’ from what it was on the 'day' before, but it cannot change during the 'day', i.e. be greater on the second half of a 'day' than on the first. . . . Hence if the income-flow is greater, and the level of prices higher on each solar day than on the preceding one, that proves that the technical 'day' does not exceed the solar day in length. . . .

Furthermore, Robertson stated that his identification of the unit time period at the beginning of his 1933 paper with "the period during which the stock of money changes hands once in final exchange for the constituents the community's real income" [Robertson, 1933, p. 399] was a "simplification adopted on p.

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[1] See also Robertson's letter to Keynes dated 23 May 1933 [reprinted in Keynes, 1973, p. 309: "The inference which I tentatively draw is that my instinct has been right in following Democritus and Planck,—the ultimate units of economic time and economic change must be conceived as finite though tiny" and also Keynes, 1973, p. 300.

[2] The following quote is taken from Robertson's response to Keynes' prepublication comments on Robertson's 1933 paper and is published in Keynes, 1979, p.26.

1 to avoid plaguing the reader with too many complexities at once, and quite definitely removed on p. 15."[3]

It is clear from these statements that the unit time period in Robertson's model is a fairly short period of time, especially in light of the suggestion that when income is changing Robertson's 'day' may be less than a solar day. It is also clear that it is inappropriate to assume that the essential properties of Robertson's model can be derived from the assumption that "the average decision period . . . is in fact the full cycle length of circulation of an average unit of transactions balances," especially in light of Robertson's explicit statements to the effect that he only introduced this assumption "to avoid plaguing the reader with too many complexities at once" and that he clearly believed "the period of circulation of money against income . . . quite certainly in real life is many 'days' long." Furthermore, it is also clear that "the unit decision period" in Robertson's model cannot "be adjusted appropriately such that k_t is unity" since the unit decision period in Robertson's model is determined by factors assumed to exist in the real world and, as such, is beyond the power of a model builder to adjust.

Thus, Tsiang's interpretation of the unit time period in Robertson's model and the relationship between this time period and the velocity of circulation is clearly erroneous, and Tsiang's 1980 attempt to demonstrate the equivalence of Robertson's and Keynes' theories of interest must be rejected: As was demonstrated above, $(Y_{t-1} - C_t^P)$ in equation (4a) cannot possibly be numerically equal to what Robertson defined as planned saving, and the only situation in which $k_{t-1}(Y_{t-1} - C_t^P)$ can correspond numerically to what Robertson defined as planned saving is if the length of the unit time period in Robertson's model is equal to k_{t-1}, a proposition which Robertson explicitly denied. Thus, Tsiang has not shown *via* his 1980 methodology that the true liquidity preference equilibrium condition (presumably given by (1)) implies Robertson's loanable funds equilibrium condition (which Tsiang argued is given by (4a)) since (4a) cannot be Robertson's loanable funds equilibrium condition.

Finally, it should be noted that what we are looking at here is an example of what Keynes referred to as "Mr. Robertson's incorrigible confusion between the revolving fund of money in circulation and the flow

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[3] This quote is taken from Robertson's response to Keynes' prepublication comments on Robertson's 1933 paper and is published in Keynes, 1979, p.26. Cf. Robertson, 1933, p. 399, 409.

of new saving which causes all his difficulties." (Keynes, 1938b, p. 321) Whether we are talking a stock of money or a flow of savings depends crucially on whether $Y_{t-1} - C_t^P$ is multiplied by k_{t-1} or not. Tsiang is unable to keep these dimensions straight even within his own model: $k_{t-1}(Y_{t-1} - C_t^P)$ represents part of the revolving stock of money in circulation; $Y_{t-1} - C_t^P$ represents the flow of new saving. The latter has a time dimension associated with it (money per 'day'); the former does not (just money). The only way they can have the same numerical value is if the unit-time period is chosen such that k_{t-1} is equal to one Robertsonian day, but, even then, *they are not the same thing*: $k_{t-1}(Y_{t-1} - C_t^P)$ is a stock (no time dimension), and $Y_{t-1} - C_t^P$ is a flow (has a time dimension) whether k_{t-1} one Robertsonian day or not.

b. Tsiang's 1956 methodology

A similar problem exists with regard to Tsiang's 1956 methodology. This can be seen by examining the monetary equilibrium condition implicit in equations (1) and (3) above:

$$(5)\quad M_t^S = k_t^c C_t^P + k_t^i I_t^P + L_t,$$

where in this specification L_t is assumed to be a function of $r_t, \pi_t,$ and W_t $(= \bar{L}(r_t, \pi_t, W_t, \dots)$ among other things (…) and, in order to emphasize the fact that there is no reason to believe that the rate at which money turns over in expenditure against consumption goods (i.e., $1/k_t^c$) is necessarily equal to the rate at which money turns over in expenditure against investment goods (i.e., $1/k_t^i$), I have taken the liberty of generalizing Tsiang's model a bit by allowing for the possibility that the k which applies to C_t^P may differ from the k which applies to I_t^P. It should, perhaps, also be noted that in this specification $k_t^c C_t^P$ and $k_t^i I_t^P$ are *amounts of money* demanded for the purpose of financing planned consumption and investment expenditures, respectively.

The stock of money held at the beginning of the period (i.e., before the credit market opens) in Tsiang's model (M_t^*) can be written:

$$(6)\quad M_t^* = k_{t-1}^c C_{t-1}^P + k_{t-1}^i I_{t-1}^P + L_{t-1}.$$

Subtracting M_t^S from both sides and rearranging yields:

$$(7)\quad M_t^S - k_{t-1}^c C_{t-1}^P - L_{t-1} - \Delta M_t^S = k_{t-1}^i I_{t-1}^P.$$

where $\Delta M_t^S = M_t^S - M_t^*$. Thus, subtracting (5) from (7) makes it possible to rewrite the monetary equilibrium condition in Tsiang's model as:

(8) $\left(k_{t-1}^c C_{t-1}^P + k_{t-1}^i I_{t-1}^P - k_t^c C_t^P\right) - L_{t-1} + \Delta M_t^S = k_t^i I_t^P$.

If it is assumed that $k_{t-1}^c = k_{t-1}^I = k_t^P = k_t^*$, then (8) can be written as:

(9) $k_t^*(C_{t-1}^P + I_{t-1}^P - C_t^P) - \Delta L_t + \Delta M_t^S = k_t^i I_t^P$,

where $\Delta L_t = L_t - L_{t-1}$. If it is further assumed that plans are always realized (i.e., that $C_{t-1}^P = C_{t-1}$ and $I_{t-1}^P = I_{t-1}$ and, thus, that $Y_{t-1} = C_{t-1}^P + I_{t-1}^P$), then this equilibrium condition can be reduced to:

(10) $k_t^*(Y_{t-1} - C_t^P) - \Delta L_t + \Delta M_t^S = k_t^i I_t^P$.

This result has been derived by reversing the procedure by which Tsiang derived the liquidity preference equilibrium condition from his 1956 [pp. 552-4] specification of Robertson's loanable funds equilibrium condition[4] and is essentially identical to this equilibrium condition, the only important difference being that k_t^* is missing from Tsiang's 1956 specification.[5] However, the fact that k_t^* does appear in (10) makes it clear that this equation cannot correspond to Robertson's loanable funds equilibrium condition since (10) is identical in form to the 'loanable funds' equilibrium condition in Tsiang's 1980 model. Thus, Tsiang's 1956 attempt to demonstrate the equivalence of Robertson's and Keynes' theories of interest must be rejected as well as his 1980 attempt, and for a similar reason. Namely, because it is impossible to replace $k_t^*(Y_{t-1} - C_t^P)$ in equation (10) with planned savings as defined by Robertson and then show that the resulting equation implies the true liquidity preference equilibrium condition presumably given by (1)—unless, of course, one is willing to argue that the length of the unit time period in Robertson's

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[4] See Tsiang's [1956, p. 552] equation (9) wherein $\Delta L_t = \frac{dMi}{dr}\Delta r_t$ and $\Delta M_t^S = \frac{\partial M}{\partial R}\Delta R_t + \frac{\partial M}{\partial r}\Delta r_t$.

[5] This omission on Tsiang's part is justified as "merely the expository device of adopting as a time unit the period during which the average velocity of transactions balances is unity." [Tsiang, 1957, p. 676.] It is worth emphasizing, however, that what is at issue in this paper is *the length of the unit time period,* not *the unit in which time is measured.* Cf. G. Ackley and S. Tsiang, 1957.

methodology is *necessarily* equal to k_t^* in spite of the fact that Robertson explicitly denied that this is so and in spite of the fact that this necessity would restrict Robertson's methodology to such an extent that it would have no applications.

c. The Source of Tsiang's Confusion

The source of Tsiang's confusion in attempting to reconcile Robertson's and Keynes' view of the theory of interest is clearly indicated by his identification of $k_{t-1}(Y_{t-1} - C_t^P)$, $k_t^*(Y_{t-1} - C_t)$, and/ or $Y_{t-1} - C_t^P$ in Tsiang's models with Robertson's definition of saving, for this identification is a clear example of what Keynes referred to as "Mr. Robertson's incorrigible confusion between the revolving fund of money in circulation and the flow of new saving." [Keynes, 1938, p. 321-2] As has been demonstrated above, the identification of $Y_{t-1} - C_t^P$ with Robertson's definition of saving in Keynes' liquidity preference theory involves an elementary confusion between a flow and a stock, and the only situation in which the other two terms can be so identified is if the length of the unit time period in Robertson's model is equal to the period of circulation of money against income, a situation which Robertson explicitly acknowledged cannot exist in the real world. However, whether this situation exists or not, $k_{t-1}(Y_{t-1} - C_t^P)$ and $k_t^*(Y_{t-1} - C_t)$ are amounts of *money*, and it is c1ear from the derivation of (4a) and (10) above that these amounts of money represent that portion of the revolving fund of money in circulation that has been received through the factor markets and, as modified by ΔH_t and ΔM_t^S, is destine to be expended through the financial or investment goods markets. In Keynes' liquidity preference theory these two terms have nothing at all to do with the flow of saving, either as defined by Robertson or as ordinarily defined in economics. They are part of the active demand for money.

It should be clear from the derivation of (4a) and (10) that the above is not the only point at which Tsiang's attempted demonstrations of the equivalence of Robertson's and Keynes' theories of interest are vulnerable. In order to get back and forth from (1) and (4a) or (10) in Tsiang's methodologies it is also necessary to assume a) the true demand for money function is linear in planned expenditures, b) the rate at which money turns over in expenditure against consumption goods is equal to the rate at which money turns over in expenditure against investment goods, and c) that planned expenditures are always realized. If any one of these conditions is not met, it is not possible to show that **(1)** implies (4a) or (10) or that either of these two equations imply (1). These assumptions, though significant in limiting the generality of Tsiang's analysis, are of secondary interest here. However, the fact that Tsiang's analysis also assumes

that (1) is the true liquidity preference equilibrium condition is of interest.

II. The Direct Effect of an Increase in Thrift

According to Tsiang [1980, pp. 467-8], Keynes' denial of a direct effect of a change in saving on the rate of interest in his controversy with Robertson is untenable. In support of this assertion Tsiang offers the fact that a decrease in planned consumption expenditures must have the direct effect of decreasing the demand for money and increasing the supply of loanable funds in his model. [See S. Tsiang, 1980, p. 474 and cf. S. Tsiang, 1956, pp. 545-52.] There are, however, three fundamental objections to Tsiang's argument in this regard.

a. Financing Planned Financial Expenditures

The first concerns the fact that Tsiang expressly refused to consider the possibility that money may be demanded for the purpose of financing planned financial expenditures. [See Tsiang, 1966, pp. 336-7, 337n.] The importance of this refusal can be seen by noting that if money is demanded for this purpose, then the monetary equilibrium condition implied by (1) and the assumption that the demand for money is linear in planned expenditures may be written as:

$$(11)\quad M_t^S = k_t^{ff}F_t^f + k_t^{fh}F_t^h + k_t^cC_t^P + k_t^iI_t^P + L_t,$$

where F_t^f and F_t^h are the rates of planned financial expenditures of firms and households, respectively, and k_t^{ff} and k_t^{fh} are the k's which apply to F_t^f and F_t^h.

Given this equilibrium condition, it is not at all certain that the direct effect of a decrease in planned consumption expenditures will be to decrease the demand for money and thereby increase the supply of loanable funds since the nature of the decrease under consideration[6] is such that $k_t^c\Delta C_t^P = k_t^{fh}\Delta F_t^h$. As a result, the net direct effect of this decision must, given (11), depend on the relative magnitudes of k_t^C and k_t^{fh}: If $k_t^C > k_t^{fh}$, the net direct effect must be to decrease the demand for money, but if $k_t^C = k_t^{fh}$ there can be no net direct effect, and if $k_t^C < k_t^{fh}$, then the net direct effect must be to *increase* the

[6] This issue was raised by Robertson in terms of a decision by the public "to spend more of their incomes on securities and less on consumable goods." [Robertson, 1938, p. 318] Cf. Robertson, 1940, p. 13.

demand for money. Thus, the meaningfulness of Tsiang's argument depends, at the very least, on his justification for assuming that money is not demanded for the purpose of financing planned financial expenditures.

Tsiang's justification for this assumption is contained in his argument that

> as soon as each individual makes his decision as to how much to spend during the coming period, he will know how much of his accumulated cash holding can be spared from his own requirement for finance, or how much further finance he must procure for his planned expenditures. It is to his interest that such adjustments of his cash holding should be carried out right at the beginning of the period. [Tsiang, 1966, pp. 136-7. See also Tsiang, 1966, p. 137n, and cf. Tsiang, 1956 and 1980.]

However, this argument is not convincing for investment decisions involve both information and transactions costs. In general, it takes *time* to gather the necessary information and/or to find a convenient opportunity to execute an investment decision even after one knows how much cash can be spared for the investment, and there are money costs associated with these decisions as well. Given these costs, there is just as much (if not more) reason to believe it is in the interest of each individual to allow his spare cash to remain idle for a period of time (and, perhaps, to accumulate to a respectable sum) in order to gather the necessary information required to make a wise investment decision, or to find a convenient opportunity to execute this decision, or to justify its money cost as there is to believe it is in the interest of each individual to adjust his cash holding immediately upon discovery of the existence of spare cash (i.e., "right at the beginning of the period"). Thus, since Tsiang's *a priori* justification for assuming that money is not demanded for the purpose of financing planned financial expenditures presupposes the absence of transactions and information costs it cannot provide a meaningful basis for his argument that a decrease in planned consumption expenditures *must* have the direct effect of decreasing the demand for money and increasing the supply of loanable funds.

But even if one were to accept Tsiang's *a priori* justification for assuming money is not demanded for the purpose of financing planned financial expenditures, there is a second, more fundamental, objection to Tsiang's argument. Namely, that Tsiang's argument is in fact irrelevant to Keynes' actual position on this issue.

b. Keynes' View of Saving and the Demand for Money

In December 1937 Keynes' stated:

> Now, I readily admit the intention to save may sometimes affect the willingness to become unliquid meanwhile. This factor should certainly be included in the list of motives affecting the state of liquidity-preferences. But it is only one amongst many, and, in practice (I should have thought), one of the least important. [Keynes, December 1937, p. 665.]

In this passage, Keynes *"readily"* admitted that "the intention to save may sometimes affect the willingness to become unliquid meanwhile" and that "[t]his factor should *certainly* be included in the list of motives affecting the state of liquidity-preferences." Thus, Tsiang clearly failed to grasp the nature of Keynes' position in this regard for, as is clear from this passage, Keynes did not deny the fact that an increase in planned saving may have a direct effect on the demand for money. The issue raised by Keynes is whether or not "in practice" this phenomenon is "important." Tsiang may disagree with Keynes on this issue, but his disagreement can only be on the practical importance of this phenomenon not on its possibility or even on its probability. Such a disagreement can be settled only on the basis of empirical evidence, and since Tsiang has provided no empirical evidence in support of his view, he has provided no basis for his assertion that Keynes' position in this regard in untenable. [Cf. Keynes; June 1937, pp. 246-8; December 1937, 663-9; 1938; and;1939.]

However, the problem with Tsiang's interpretation of Keynes' position with regard to the directs effect of an increase in thrift of the rate of interest goes beyond the fact that Tsiang failed to see that Keynes did not deny a change in saving may have a direct effect on the demand for money.

c. Simultaneous Equation versus Partial-Equilibrium Analysis

In June 1938, Robertson attempted to bring the fundamental issues of his controversy with Keynes, as he saw it, to a head by considering a situation in which an increase in planned investment has placed pressure on the rate of interest to rise and asking:

> Suppose ...the public decide to spend more of their incomes on securities and less on consumable goods. Under what conditions will this decision tend to relieve the congestion in the capital market? [Robertson, June 1938, p. 318).]

In turn, Keynes responded:

> My answer to Mr. Robertson's question on p. 318 is, I hope fairly obvious . . . The congestion in the capital market can only be relieved by something which reduces the demand or increases the supply of cash; the total demand for cash being partly a function, as I have pointed out above, of the level of employment and income. If the reduction in consumption posited by Mr. Robertson leaves aggregate income unchanged, there is no relation to suppose that it will reduce the demand for cash or relieve

> the congestion. If, however, it leads to a reduction in income, the resulting diminution in the demand for cash would help to relieve the congestion. [Keynes, 1938, p. 321.

Keynes made two points in this response that are of particular relevance here. The first is that the congestion in the capital market can be relieved by a reduction in consumption (i.e., an increase in thrift) if, and only if, it has an effect on the supply or demand for cash (i.e., money). The second is that since the demand for cash depends on income, a reduction in consumption that leads to a reduction in income must *(ceteris paribus)* relieved the congestion. In light of Keynes' explicit statements in this regard, it would seem that in order to demonstrate that Keynes' denial of a direct effect of an increase in thrift on the rate of interest is untenable, one must show that it is possible for an increase in thrift to have an effect on the rate of interest when both income and the supply and demand for money are given.

The problem is that Tsiang [1980 p. 172; 1956, p.553] assumed that *planned* consumption and investment are always equal to *actual* consumption and investment. Thus, he implicitly assumed that both the rate of interest and expectations, employment, output, and/or prices and, hence, the value of output produced during each period (i.e., current income), adjust *simultaneously* and *instantaneously* each period to equate both current period *ex ante* saving and investment and current period supply and demand for money. As a result, the question as to whether or not an increase in thrift, given income and the supply and demand for money, can have an effect of the rate of interest cannot, even in principle, be examined in Tsiang's model since the structure of this model is such that there is no way in which the effects of the implicit change in current income can be separated from the effects of the increase in thrift.

III. The Demand for Money and the Production of Goods

Toward the beginning of his final attempt to explain his theory of interest to Robertson, Keynes summarized his concept of the demand for money as follows:

> The total demand [for liquidity] falls in two parts: the inactive demand due to the state of confidence and expectation on the part of the owners of wealth, and the active demand due to the level of activity established by the decisions of the entrepreneurs. The active demand in its turn falls in two parts: the demand due to the time-lag between the inception and execution of the entrepreneurs' decisions, and the part due to the time-lags between the receipt and disposal of income by the public and also between the receipt by entrepreneurs of their sale-proceeds and the payment of them of wages, etc. [Keynes, 1938, p. 319]

According to Tsiang:

> The second element of what he [Keynes] classifies as the active demand really does not deserve this title. It should rather be called the "passive acceptance of money;" for these sums are not what the public or entrepreneurs plan to keep in the form of money, but are merely what they passively accept for services rendered or goods sold pending rational disposal later on at a more appropriate time. [Tsiang, 1980, p. 475]

Tsiang's statement to the effect that the second element of the active demand for money as explained by Keynes should be called "passive acceptance of money" rather than a demand for money is a clear misinterpretation of Keynes' explanation of the active demand for money. In Tsiang's own model, $k_t^c C_t^P$ in equation (3) is, in fact, money demanded "due to the time-[lag] between receipt and disposal of income by the public," as is $k_t^f F_t^P + k_t^c C_t^P$ in the extension of this model embodied in equation (11). Furthermore, Tsiang's failure to understand the demand for money "due to the time-[lag] . . . between the receipt by entrepreneurs of their sale-proceeds and the payment by them of wages, etc." within the context of his model is not surprising in view of the fact that, in his model, the demand for money of the part of firms that arises from the need to finance expenditure on wages, intermediary goods, interest and dividend payments, and other kinds of expenditures that arise from the need to finance the production of various kinds of goods is ignored in that, at the point in time at which the demand for money is measured in Tsiang's model (i.e., at the beginning of the period), there is no demand for money on the part of firms to finance these kinds of expenditures. But there is just as much reason to assume entrepreneurs demand money for the purpose of financing expenditures that arise from the need to finance the *production* of goods as there is to assume that consumers and investors demand money for the purpose of financing expenditures that arise from the need to finance the *purchase* of goods, and it is hardly appropriate to dismiss the demand for money on the part of firms to meet their payrolls as "passive acceptance of money."[7]

The relevance of Tsiang's omission in this regard can be seen by assuming that, as a result of concomitant increases in accounts payable and the need to prepay certain purchases, the current period demand for

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[7] When investors produce their own investment goods there is, of course, an overlap between the demand for money for the purpose of financing planned investment expenditures and the demand for money for the purpose of financing the planned production of investment goods. The point is, however, that when investors do not produce their own investment goods these two demands are distinct, and, in either case, there must be a demand for money that arises from the need to finance the production of investment and other kinds of goods as well. This demand is missing in Tsiang's model.

money that arises from the need to finance the production of goods depends on both previous period actual output (Y^a_{t-1}) and current period planned output (Y^P_t) and rewriting (11) as:

$$(12)\quad M^S_t = k^{ya}_t Y^a_{t-1} + k^{ff}_t F^f_t + k^{fh}_t F^h_t + k^c_t C^P_t + k^{yP}_t Y^P_t + k^i_t I^P_t + L_t,$$

When this is done, the aggregate demand for money as given by the right-hand side of (12) is easily interpret in terms of Keynes' description of the total demand for liquidity in the passage quoted above. Since the "inactive demand due to the state of confidence and expectation on the part of the owners of wealth" is assumed to be included in L_t, that part of the active demand "due to the time-lag between the inception and execution of the entrepreneurs' decisions" is given by $k^{yP}_t Y^P_t + k^i_t I^P_t$; that part of the active demand "due to the time-lags between the receipt and disposal of income by the public" is given by $k^{fh}_t F^h_t + k^c_t C^P_t$, and that part of the active demand due to "receipt by entrepreneurs of their sale-proceeds and the payment of them of wages, etc." is given by $k^{ya}_t Y^a_t + k^{ff}_t F^f_t$. Thus, when Tsiang's specification of the demand for money is extended in such a way as to incorporate the need to finance planned financial expenditures as well as to finance the production of goods there is no difficulty at all in understanding Keynes' description of the total demand for liquidity.

IV. The Supply of Finance

Keynes concluded his final attempt to explain his concept of 'finance' to Robertson as follows:

> It is Mr. Robertson's incorrigible confusion between the revolving fund of money in circulation and the flow of new saving which causes all his difficulties. Saving has no special efficacy, as compared with consumption, in releasing cash and restoring liquidity. . . . Consumption does just as well. . . . A given level of activity and income will involve the same active demand for cash, if the technical conditions governing the time-lags are the same, irrespective of the current rate of net investment and saving. . . . In short, I accept the usual view that the demand for cash in the active circulation is a function of income and of business habits, not of saving. The 'finance,' or cash, which is tied up in the interval between planning and execution, is released in due course after it has been paid out in the shape of income, whether the recipients save it or spend it. There is, therefore, just as much reason for adding current consumption to the rate of increase of new bank-money in reckoning the flow of cash becoming available to provide new 'finance,' as there is for adding current saving.[1] Until Mr. Robertson understands that, he will not grasp what I am driving at, however carefully I attempt to reword it. [Keynes, 1938, pp. 321-2]

In commenting on this passage, Tsiang observed that "Robertson failed completely to understand Keynes' strange logic that would make both consumption and savings equally the components of the supply of

finance" and that "[h]ow Keynes could have arrived at such an amazing conclusion is indeed an historical puzzle." [Tsiang, 1980, p. 476] Tsiang then attempted to explain Keynes' presumed confusion on this issue by observing that C_{t-1} and I_{t-1} (the sum of which is equal to C_t and Y_{t-1} in Tsiang's model) enter (4a) with the opposite sign of C_t and I_t:

> This is perhaps what Keynes had in mind when he wrote: "Finance is a revolving fund. . . . As soon as it is used in the sense of being expended, the lack of liquidity is automatically made good. That is, consumption and investment expenditures actually carried out, C_{t-1} and I_{t-1} appear to provide the finance for the new consumption and investment expenditures planned, C_t and I_t. . . .
>
> So far, it seems to be all right. However, when Keynes went on to assert with equanimity that "consumption is just as effective in liquidating short-term finance as saving is," he was clearly wrong about timing . . . . At the moment of decision for the current period . . . C_{t-1} is already a given datum of the past. It is no longer a decision variable. Only current consumption C_t , or its complement, saving ($Y_{t-1} - C_t$), is still to be decided together with the current investment plans. From equation . . . (4a), it is obvious that C_t would be competing with current investment, I_t for available finance. It is only ($Y_{t-1} - C_t$) = S_t that can properly be said to provide the finance for investment apart from dishoarding or money creation. [Tsiang, 1980, pp. 476-7]

Aside from the obvious confusion of flows for stocks in this passage,[8] and the failure to distinguish between *planned and actua1* magnitudes, the above seems to have been written with a total disregard for what Keynes actually said on this subject.

a. Consumption, Saving, and 'Finance'

It seems quite clear that Keynes' point in the passage quoted at the beginning of this section is that *"given the level of activity and income,"* and *"if the technical conditions governing the time-lags are the same,"* and if one accepts *"the usual view that the demand for cash in the active circulation is a function of income and of business habits, not of saving,"* then it can be assumed that changes in saving do not have a *direct* effect on the supply or demand for money. [See Keynes; 1930, pp. 140-6; 1931, p. 415-9; 1936, pp. 179-81; June 1937, p. 250-1; 1938; 1939.] In this *ceteris paribus* situation, finance balances can always be replenished as they are spent irrespective of the *rates* of consumption and saving by households since all money received by households in the form of income payments, by *assumption*, must be returned to firms at a constant rate through the credit and goods markets. The only thing that a

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[8] A confusion that is not reconciled by assuming that the length of the unit time period is equal to k_{t-1} since even under this assumption each of the terms in the above passage must be multiplied by k_{t-1} in order to convert them to stocks if equation **(**1**)** is assumed to be the true liquidity preference equilibrium condition.

change in saving can accomplish is to change the individual rates at which money is returned to firms through the individual markets but not the rate at which money is returned to firms through the two markets combined. Given the supply and demand for money, a change in saving cannot change the rate at which money is made available to investors to replenish their finance balances—only *a change in one of the other demands for money or in the supply of money can change this rate.* Thus, in the specific *ceteris paribus* situation posited by Keynes in the above passage it is logically impossible for an increase in saving to have a *direct* effect on the amount of money available to meet an increase in the demand for finance balances. [See Lerner 1944; Robinson 1950, pp. 106-9; and Blackford, 1983 and cf. Robertson; 1937, p. 435n; 1940, p. 18n.]

Keynes' statement to the effect that the "'finance,' or cash, which is tied up in the interval between planning and execution, is released in due course *after* it has been paid out in the shape of income" clearly indicates the mechanism by which Keynes assumed money "tied up in the interval between planning and execution" becomes available to be tied up again—namely, by being spent, received, and paid out in the shape of income. There is no reason to believe that Keynes' statement to the effect that "consumption is just as effective in liquidating short-term finance as saving is" means anything other than what is implicit in the above—namely, that once money has been received in the shape of income, it makes no difference whether it is spent on consumption goods or saved and, thus, (given the supply and demand for money) spent on securities in that in either case the money so received and spent and continues on as part of the revolving fund of money in circulation *without affecting the size of this fund.* This does not mean, of course, that a decision with regard to saving cannot, or even does not, have an effect on the supply or demand for money and, thereby, on the rate of interest. It only means that a decision with regard to saving cannot have a *direct* effect on the rate of interest that is *independent* of its effects, either direct or indirect, on the supply and/or demand for money. [See Blackford, 1983.] To the extent that a change in saving does have an effect on the supply or demand for money, there must, of course, be an effect on the rate at which money is made available to investors to replenish their finance balances. But, nevertheless, *within the context of Keynes' assumptions,* the *ceteris paribus* argument put forth by Keynes in the above passage is valid.

b. Tsiang's Objection to Professor Merrless' Argument

In response to an argument similar to the above with regard to an increase in consumption, Tsiang argued:

> This argument contains a major flaw, which has already been pointed out by Robertson himself [Robertson, 1940, p. 5]. That is, apart from the difference in timing of the availability of proceeds, the proceeds of the sales of consumers' goods would normally be earmarked to finance the reproduction of the consumers' good sold. It wi11 not be available to finance new investment, unless the entrepreneur concerned decides not to replace the reduced stock. In the latter case, it is the deliberate disinvestment of inventory on the part of the entrepreneur, not the consumption of the public itself, that provides the finance for new investment. [Tsiang, 1980, p. 477n.]

Although Tsiang sees this argument as a rebuttal to Keynes' position, the fact that "the proceeds of the sales of consumers' goods would normally be earmarked to finance the reproduction of the consumers' good sold" is the essence of Keynes' point in that consumption expenditures normally provide the 'finance' needed for the kind of reinvestment Tsiang is considering. [Cf. Keynes; June 1937, pp. 246-8; December 1937, 663-9; 1938; and 1939.] In addition, if there is an increase in the *rate* of consumption expenditures and the additional 'finance' obtained in this way is in fact "earmarked to finance the reproduction of the consumers' good[s] sold" at this higher *rate* of consumption expenditures, then an *increase* in the demand for investment finance (i.e., money) is implied (and as effective demand changes a further increase the demand for money is implied as well) that "cannot be met without a rise in the rate of interest, unless the banks are ready to lend more cash or the rest of the public to release more cash at the existing rate of interest," [Keynes, 1937, p. 668] which is, of course, an integral part of Keynes' theory. [Cf. Keynes; 1937, pp. 246-8, 663-9; 1938; and 1939.]

By the same token, if the additional 'finance' obtained in this way is not earmarked but, rather, is put on the market (and if there is no change in effective demand) then there will be no increase in the demand for investment finance or any other demand for money, and there will be no need for the rate of interest to change. But the point is that *whether the rate of interest must increase* or *remain unchanged in this situation can only be explained in terms of what is happening to the supply and demand for money.* Specifically, it cannot be explained in terms of what is happening to saving and investment for if firms allow their cash balances to accumulate in this situation the rate of interest must increase whether there is "deliberate disinvestment of inventories on the part of entrepreneurs" or not, and if firms do not allow their cash balances to increase the rate of interest cannot change irrespective of the disinvestment decisions of entrepreneurs.[9] [See Blackford, 1983; and cf. Robinson; 1950, pp. 106-9; Robertson; 1936,

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[9] It is exceedingly difficult to understand Tsiang's statement to the effect that "it is the deliberate disinvestment of inventory on the part of the entrepreneur . . . that provides the finance for new investment." Even within the context of his own view of

p. 178; 1937, p. 435n; 1940, p. 18n; and Cf. Keynes; June 1937, pp. 246-8; December 1937, 663-9; 1938; and 1939.] Thus, the "major flaw" in Keynes' argument that was pointed out by Robertson in 1940 and explained by Tsiang in the above passage is not in fact a rebuttal to Keynes but, rather, is simply an indication of the extent to which Robertson and Tsiang were unable to understand what Keynes was trying to say.

c. The Source of Tsiang's Confusion

Keynes' argument with regard to the inability of an increase in saving to provide an increase in 'finance' is a *ceteris paribus* argument in which those factors that determine the positions of the supply and demand for money curves as plotted against the rate of interest are explicitly assumed to be included in the *ceteris paribus* assumption. Thus, the inability to understand this argument within the context of Tsiang's model is not surprising. Given its implicit simultaneous equation specification, it is impossible to consider the affects of a *ceteris paribus* change in saving within the context of Tsiang's model (even if the demand for money function were specified properly within this context) because all variables are assumed to change simultaneously and instantaneously to achieve their equilibrium values within each period in Tsiang's model.

V. Summary

It has been demonstrated above that there are four fundamental objections to Tsiang's analysis of the issues that separated Robertson and Keynes in the liquidity preference/loanable funds controversy. The first is the elementary stock/flow confusion in identifying $Y_{t-1} - C_t^P$ in equation (4a) as being what Robertson defined as planned saving. The second is the failure to recognize the necessity for assuming that the length of the unit time period be equal to the inverse of the velocity of circulation of active balances in his attempted reconciliation of Robertson's and Keynes' views of the theory of interest. The third is the failure to specify properly Keynes' money demand function in attempting to show that an increase in thrift must have a direct effect on the rate of interest and the mistaken belief that Keynes was somehow confused in his interpretation of the demand for money. The fourth is the misinterpretation of

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this problem it would appear that the "deliberate disinvestment of inventories" must be exactly offset by the deliberate decrease in saving in this situation and that, as a result, there would be no additional "finance for new investment" provided as a consequence of these actions.

Keynes' actual position in this controversy in that Keynes did not argue, as Tsiang asserted, that a change in planned saving cannot have a direct on the demand for money or that an increase in thrift cannot have an effect of the rate of interest in the face of a fall in income, but only that an increase in thrift cannot have an effect on the rate of interest if it is unaccompanied by a change in income or in the supply or demand for money.

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