

# **Speculation, Liquidity Preference and Monetary Circulation**

by

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The objective of this essay is to give a general overview of the dynamic interaction of industrial and financial circulation, focusing specifically on the macroeconomic effects of asset market speculation in the context of the latter. Much of the emphasis in this discussion is on some of Keynes' arguments in his *Treatise* which had been eclipsed by his much better known GT. In his latter work, Keynes tried to show the validity of the principle of effective demand even in the turf of the mainstream economists by basing his argument on conventional assumptions as much as possible. He often referred to his *Treatise* on technical details of monetary and financial matters and remarked that his two works complemented each other. But, among his readers in later generations, few had the benefit of any in depth knowledge of his earlier work. But, also, substantively, the formulation of his 'liquidity preference' argument into a theory of the interest rate and the sharp exchanges with some of his critics on the loanable funds theory made it harder to appreciate the degree of continuity in his thought with the tradition of monetary analysis that emanates from Wicksell, of which the *Treatise* was a part. As he (and his followers) became embroiled in debates with mainstream economists in the aftermath of the GT, many of his insights in the *Treatise* were lost or abandoned because they no longer fit easily in the truncated theoretical structure he adopted in his latter work. For later economists, this has made it harder to appreciate, let alone pursue, Keynes' early insights. This essay errs, if at all, on the other side as it highlights these early insights at the expense of Keynes' formulation of his views in the GT.

## **Wicksell, the Quantity Theory, and Monetary Theory of Production**

In the Quantity Theory, an exogenous increase in the supply of money leads to a higher price level because agents are thought to bid up commodity prices with their increased money balances. As Wicksell (1906, pp. 159-60) realized, this implies that in the transition period during which money income rises to a higher equilibrium level total demand has to exceed aggregate supply. In other words, Say's Law could not possibly hold and money has to have 'real' effects in the short run defined as the period of adjustment to a higher position of equilibrium. As he put it, the availability of finance in the form of bank credit to 'deficit units' frees investment from past savings, making it possible for total expenditures to exceed total income, and thus an excess of investment over savings corresponds to an excess supply (demand) of money. By implication, the classical dichotomy does not hold since money is no longer a 'veil' at least in the short run.

Wicksell was also first to realize that the banking system would - as long as it acted in tandem - endogenously expand the money supply by simply extending credit to firms,

which returned to them in the form of deposits. Given the banks' ability to create credit money, Wicksell argued that a fall in the money rate of interest below the return on new capital, which he called the natural rate of interest, would give rise to a cumulative process of inflation – assuming that full employment held and output remained fixed. The process could also work in reverse, giving rise to a cumulative process of deflation when the money rate of interest rose above the natural rate. In the 1920s, it was not uncommon to think of recessions as being caused by a natural interest rate that fell (either because of overinvestment or technological reasons) below a constant money rate of interest (Ellis 1934). In fact, Leijonhufvud (1967, 1981) is convinced that Keynes' central insight is a refinement of this basic Wicksellian idea, in which bear speculation in financial markets prevents the bond rate of interest from falling sufficiently following a fall in the natural rate of interest. As we shall see, however, there was more to Keynes' "early" contribution.

Writing in the Quantity Theory tradition, Keynes' main contention in his *A Tract on Monetary Reform* was that price fluctuations over a business cycle was characterized not so much by exogenous shifts in the money supply but rather by systematic changes in the demand for real money balances. He thus argued that any attempt on the part of monetary authorities to keep the money supply steady would fail to achieve price stability (CW JMK, vol. IV, p. 69). Instead, he argued, the more effective policy would be to aim at changing the money supply to compensate for the systemic shifts taking place in the demand for real money balances over the credit cycle. If changes in desired money-balances had a systemic character, this also meant that the excess of investment over saving could correspond to a fall in demand for money in relation to supply as well. In other words, the increased supply of money which Wicksell argued is the dual of the difference between investment and savings could just as well come about by a fall in demand for money balances through dis-hoarding rather than a rise in total money supply. Likewise, periods of excess savings would be characterized either by increased monetary hoarding or decreasing money supply, or both. The disaggregation of money demand by the type of agent and transaction in the *Treatise* was thus motivated in part by Keynes' desire to analyze changes in hoarding over the credit cycle.

Keynes' second novel contribution to the basic Wicksellian theme is the insight that over a credit cycle involving the transition from one position of equilibrium to a higher one, the prices of capital goods vary systematically in relation to those of consumer goods. Later partially revived by Minsky's "two price" theory (Kregel 1992), this view holds that the prices of capital goods are determined in financial markets by profit expectations that are reflected – though not always accurately as we shall see - in securities prices, while consumer goods prices are determined by the relative magnitude of consumer demand in relation to the available supply. Thus, the very *modus operandi* of monetary expansion involves changes in the relative values of capital and consumer goods, and that is why the Classical Dichotomy, Keynes held, was not viable. The idea is that monetary injection has a direct and immediate impact on the prices of financial assets (and thus works quite rapidly on new investment goods), but affects consumer goods prices only indirectly and slowly as the level of activity in the investment sector expands. After the

GT, this idea all but disappeared as macroeconomics came to be associated with one-commodity models even among Keynesians (Leijonhufvud 1968, p. 23).

Finally, in the *Treatise*, Keynes then links expected changes in securities prices over the credit cycle to changes in net hoarding – his first innovation - through the variations in the stock demand for financial assets, by what he called the ‘state of bearishness.’ For instance, a period of early expansion is characterized in his view by excess investment, expected increases in asset prices and falling state of bearishness, and thus net dishoarding. This makes it all the more easier for banks to accommodate a rising level of activity without having to raise the money rate of interest. In his approach, speculation about asset price expectations is an integral part of the investment savings nexus, where changes in the state of bearishness has a direct *quantity* effect first and foremost on the relative size of inactive balances without necessarily causing a change in the rate of interest or asset prices in general.

As argued below, this framework afforded a setting where the effects of market speculation and asset price bubbles on monetary circulation could be discussed directly in a way that became impossible to do in the GT. In the reformulated version of the argument in the GT, as we shall see, changes in the liquidity preference function lacked any determinate functional link to speculative asset price expectations, with the result that shifts in them were seen to be caused by unexplained – and, by implication, unpredictable - shifts in market psychology. Moreover, whatever shift occurred would have solely a direct *price* effect, causing the rate of interest to vary until the “aggregate desire to hoard becomes equal to the available cash.” Below, I first discuss Keynes argument in the *Treatise* and then move onto discuss how some of these insights were lost in the GT

### **The Argument in the *Treatise***

An essential feature of Keynes’ argument in the *Treatise* is the contention that the prices of investment goods are subject to forces that are quite different than those that bear upon the consumer goods prices. Keynes’ First Fundamental Equation in the *Treatise* (which gives the prices of consumer goods) derives from an intersectoral balance condition, not much different than the one in Marx’s schemes of reproduction. It sets the price of consumer goods equal to the cost of production, adjusted as to whether profits are above or below ‘normal.’ Price exceeds cost or production, and profits are above normal, when the net supply of consumer goods falls short of demand. Whether the demand for consumer goods is equal to its supply depends on whether the value added in the investment good sector, what Keynes called ‘cost of investment,’ is equal to savings in both sectors. Thus, with a given cost structure and level of savings, the price of consumer goods varies with the level of activity in the investment goods sector. By contrast, the price of investment goods does not directly depend on the relative magnitudes of investment and savings. Profit expectations, along with the state of bearishness and behavior of the banking system, determine the price of securities which in turn reflects the demand price for new investment goods. A positive difference between the demand price of investment goods thus determined and the cost of producing them gives rise to

windfall profits, stimulating an increase in the level of activity in this sector. A higher level of activity, i.e., cost of investment (value added) in the investment sector, in turn, raises the demand for consumer goods and gives rise – with a constant level of savings – to windfall profits in the consumer goods sector as well. Thus, the direction of causation in Keynes' account of the credit cycle runs from financial conditions, interpreted broadly, to the price of securities (and thus the demand price of investment goods), and from windfall profits thus determined and the change in the level of activity that causes to the total demand for consumer goods.

Setting off a debate that keeps recurring to this day, Robertson (1931) objected to Keynes' employment of two separate principles to determine, respectively, the investment and consumer goods prices. He argued that Keynes could insulate the price level of new investment goods from changes in the flow of savings only because he was assuming that over-saving was associated with hoarding and under-saving with dis-hoarding. This argument was only partially true in part because it misspecified the real issue of contention between them. The very logic of the Quantity Equation as an accounting identity, as Wicksell laid bare, requires that a reduction in monetary income (over-saving) involves a decreased monetary circulation. This can come about either through a fall in the total quantity of money or increased hoarding, or some combination of the two. Thus, if the quantity of total money is not decreasing, over-saving has to be associated with an increase in net hoarding, and thus a fall in the overall velocity for the broad money supply. Otherwise, over-saving and thus a fall in monetary income could not have occurred.<sup>1</sup> So, there was something to Robertson's objection. But, the real contentious issue in his criticism was whether or not this increase in inactive balances (hoarding) would also translate into excess demand for financial assets. If it did, as Robertson seems to have argued, then, clearly the price of securities (and thus that of new investment goods) could not be determined independently of savings as Keynes had. Thus, Keynes' 'two price' theory was (or should have been) the central issue in this debate.

In his rebuttal of Robertson, Keynes argued that a situation of over-savings involves windfall losses for a class of entrepreneurs who would be forced to liquidate a part of their asset positions in order to be able to meet their current financial obligations that can no longer be covered by sale proceeds (CW JMK, vol. XIII, pp. 219-36). Thus, the increased demand for financial assets, if indeed inactive balances caused that, would be balanced by the increased supply coming from those entrepreneurs running down their reserves of financial assets to compensate for their windfall losses. In other words, the increase of wealth savers experience at the end of the period would be matched by the decrease of wealth experienced by entrepreneurs facing windfall losses. The prices of financial assets would then remain basically unchanged, provided that the state of bearishness of savers is not significantly different than that of entrepreneurs. While this argument is plausible, it might have detracted attention from the real issue.

For Keynes' stronger argument is of course the broader justification for his 'two-price' theory, which he also restated in his rebuttal (CW JMK, vol. XIII, pp. 220). In the language of modern finance theory, this can perhaps be put more succinctly: The price of

an asset is determined solely by its expected future price, independently of its current flows of supply and demand, if these flows are dwarfed by speculative stocks that are *very* large. Thus, the impact of ‘outside’ supply and demand on the current price can be only indirect, through its influence if any on the expected future price of the asset in question.<sup>2</sup> In a nutshell, this was the gist of Keynes’ argument in justification of his ‘two-price’ theory. Already in the *Treatise*, Keynes had made a distinction between the decision to save in the sense of non-consumption, and the decision on how to dispose of what is not consumed, and remarked that the main consideration in making the latter decision is the current and expected future asset prices, which also influenced how all financial wealth was held. Because the marginal increase in financial wealth, equal to the savings used to purchase securities, was “trifling” in magnitude compared to the total stock of wealth, expectations about the future asset prices were much more important than the marginal increase in the demand for financial assets. The way he put it, the ‘excess bearish’ factor, an inverse index of the stock demand for securities, reflected the public’s demand for inactive balances (saving deposits) given their expectations (and degree of their confidence in them) about future asset prices, and the current asset prices changed accordingly to the extent the banking sector chose not to accommodate the changes in public’s demand for saving deposits (inactive balances). In other words, with a given banking sector policy, future asset price expectations governed the current prices of securities (and thus those of investment goods), reflecting in part profit expectations in the real economy along with the other considerations summarized under Keynes’ famous ‘beauty contest’ analogy in the GT (see below).

Quite aware of the important role the ‘two-price’ view played in Keynes’ overall scheme, Leijonhufvud (1968, 1981, Ch. 7) gives a similar, though a narrower, account of Keynes’ argument in support of it.<sup>3</sup> He holds that, even as early as in the *Treatise*, Keynes explained why the interest rate fails to equilibrate investment and savings, by referring to *bear* speculation that results from the inelastic expectations speculators hold about the future bond prices following a fall in the *natural* rate, which prevents the current bond rate from adjusting downward. A falling *natural* rate of interest means a rising price of newly issued financial assets whose supply decreases in relation to its demand with the falling off of investment demand. Because the *bear* speculators satisfy the excess demand of savers for financial assets thinking that the asset price increase is only temporary, the long bond rate cannot fall to the level of the *natural* rate. In other words, the expected future asset prices determine the current interest rate independently of the supply and demand flows. As remarked before, however, there is more to Keynes’ argument in the *Treatise* than Leijonhufvud’s account suggests. The inelastic expectations, on which Leijonhufvud places such great emphasis, preclude both destabilizing speculation and asset price bubbles that played an important part in the argument in the *Treatise*, to which I turn next.

### **Asset Price Speculation in the *Treatise***

In Keynes’ discussion of credit cycle dynamics, in early expansion the rising level of activity does not typically lead to a higher interest rate even with a constant total money

supply, because of a falling state of bearishness (dishoarding). Optimistic asset price expectations cause the overall size of inactive balances - which Keynes took to be the index of the state of bearishness – to steadily decrease. This configuration, a decreasing volume of inactive balances (bear position) at a time of rising security prices, is what Keynes called a “bull market with a consensus of opinion,” which is one of the four types of speculative markets he defined in connection with the different phases of a credit cycle (CW JMK, vol. V, p. 226). Corresponding to late expansion, he held, is a “bull market with a difference of opinion” which is characterized by a rising bear position at a time of increasing security prices. In early expansion, the preponderance of market opinion holds that security prices have not risen sufficiently, while in late expansion the increasing bear position means that an ever rising segment of the market begins to think that security prices have risen more than sufficiently. Similarly, early recession is characterized by a “bear market with a consensus,” and again Keynes distinguishes this from a “bear market with a division of opinion.” The former involves a rising bear position at a time of falling security prices and the latter a decreasing bear position when security prices are still falling. In the former, the predominant market opinion holds that security prices have not fallen sufficiently and in the latter that they have fallen more than sufficiently.

From the point of view of orthodox theory of finance, it does not make any sense to say that security prices have increased or decreased more, or less, than *sufficiently* if no new information has emerged at a given point in time. For, if securities are thought to be undervalued, then arbitrageurs would continue to buy them until their prices are bid up to a level that is no longer considered low. Likewise, if securities are thought to be overvalued, again, arbitrage would bring their value down to a level consistent with what is considered to be their ‘true’ value. Thus, at a given point in time characterized by a given information set, the prevailing asset prices must be the best estimates of fundamental values.<sup>4</sup>

However, Keynes’ approach in the *Treatise* is consistent with the modern “noise trader” (or the so-called *behavioral*) approach to finance, which holds that *riskless* arbitrage is not effective in relation to the prices of shares or bonds as a whole and severely limited even when it comes to the relative prices of individual assets (Shleifer & Summers 1990, Shleifer & Vishny 1997). According to this view, even when it is assumed that arbitrageurs know what fundamental values are, they face no *riskless* arbitrage opportunities when actual prices deviate from their true values. For with a finite time horizon, an arbitrageur faces two kinds of risk: when s/he, say, sells overvalued assets short it is possible that by the time s/he is supposed to liquidate his/her position (i). the economy can grow so rapidly that the true values increase, or, more importantly, (ii). the asset prices might be even more overpriced. In both cases, the arbitrageur would be experiencing heavy losses. Thus, the fear of loss would limit the initial positions the arbitrageurs take and thus prevent them from driving prices down in any significant way. Moreover, if we drop the assumption that arbitrageurs know what the true values are, the risk of loss they face is higher, and the compensatory shift in demand for the undervalued securities smaller.

In the *Treatise*, in a vein very similar to the modern behavioral approach, Keynes remarks that when prices deviate from their ‘true’ values no automatic mechanism exists in the short run to check their deviation. *Opinion*, or what we would today call, *noise* (Black 1986) moves prices. “If everyone agrees that securities are worth more, and if everyone is a ‘bull’ in the sense of preferring securities at a rising price to increasing his savings deposits, there is no limit to the rise in price of securities and no effective check arises from a shortage of money” (CW JMK, vol. V, p. 229). However, as prices continue to rise, a ‘bear’ position begins to develop, and that is what can eventually check the rise in prices. “...[I]n proportion as the prevailing opinion comes to seem unreasonable to more cautious people, the ‘other view’ will tend to develop, with the result of an increase in the ‘bear’ position...” (CW JMK, vol. V, p. 228-9).

In Keynes’ discussion in the *Treatise*, the rise of the bear position at a time when security prices are rising plays an important role in explaining the turning point of a business cycle expansion. In his view, “it is astonishing ... how large a change in the earnings bill can be looked after by the banking system without an apparent breach in its principles and traditions” (CW JMK, vol. V, p. 272). Yet, the banking system’s ability to accommodate a rising level of production is typically impaired at some point during a business cycle expansion. That happens typically not because the banking sector is held back by the central bank or faces some intrinsic difficulty, but because the financial sentiment falters. The trigger can have a myriad of immediate causes but the underlying reason is almost invariably the fact that the actual performance of profits, though they might still be rising, falls short of the high expectations that are already capitalized in asset prices. As the view that the market might be overvalued begins to take hold, the bear position develops, and “...the tendency of the financial circulation to increase, on the top of the increase in the industrial circulation ...break[s] the back of the banking system and cause it at long last to impose a rate of interest, which is not only fully equal to the natural rate but, very likely in the changed circumstances, well above it” (CW JMK, vol. V, p. 272).

In a similar manner, a declining bear position during a business upswing prevents the interest rate from rising with increasing levels of activity. Again, *stock* decisions dominate *flow* decisions. It can, stylistically, be thought that in a given accounting period the amount by which the net increase in new securities issued by firms (investment) exceeds the net increase in demand for such securities by savers (savings) are purchased by those speculators who, expecting securities’ prices to rise, draw down saving deposits in the aggregate. In fact, if the bullish sentiment is strong enough the prices of securities can even rise, implying that the bond rate might actually decrease rather than increase. Thus, independently of the policy of the banking system, an increase in investment in excess of saving need not put any downward pressure on asset prices.

### **The ‘Beauty Contest’**

Ever since Friedman (1953) argued that destabilizing speculation would be unprofitable, and, thus, unsustainable in the long run, the mainstream view among economists have

assumed that speculation as a rule could not be destabilizing. Asset price bubbles were considered highly unlikely if not impossible in a ‘normally’ functioning market. The intuition behind Friedman’s argument rested on a simple view of arbitrage, in which the market comprises smart traders who know the true values and misinformed noise-traders. If securities are undervalued, as the argument goes, then the smart traders would continue to buy them until their prices are bid up to their true value. Likewise, if securities are overvalued, smart traders would sell them, bringing their price down to their true value. Indeed, under these conditions, speculation is always stabilizing and profitable. Misinformed noise traders create riskless arbitrage opportunities that smart traders profit from, while making losses themselves. In other words, this implies that the rate of current price change is a function of the difference between the current price and the expected future price, which is by assumption equal to *true* value. In simple terms:

$$\frac{dP}{dt} = j(P^e - P), \quad (1)$$

where,  $P^e$ , the future expected price, is assumed to be constant ( $P^e = \bar{P}$ ) and equal to the *true* value, and  $j$  is the adjustment coefficient indicating the speed with which traders respond to changes in current price. When

$$P > P^e \quad \text{then} \quad \frac{dP}{dt} < 0$$

and  $P < P^e$  then  $\frac{dP}{dt} > 0$ .

The time path of price is given by,

$$P(t) = P(0)e^{-jt} + P^e,$$

which clearly cannot be unstable, since the stability condition  $j > 0$  is always satisfied because the speed of adjustment is positive by definition.

Undoubtedly, the assumption that smart traders or speculators know with certainty what the true value is exceedingly unrealistic. But, even under this strong assumption, it does not necessarily follow that the deviation of the current price of an asset from its true value creates a riskless arbitrage opportunity. As mentioned above, the speculator who sells overvalued assets short can find that by the time s/he is supposed to close his/her position, the true value has increased, or, that the assets in question have become even more overpriced. Thus, even if the true value is known, it does not follow that it would be equal to the expected future price.

This also takes us very close to a world described in Keynes’ (1936, Ch. 12) famous beauty contest analogy, where speculators base their expectations of future asset prices

not only on what they think the true values is, but, more importantly, on what they think the average opinion about the average opinion is. In other words, *noise* is at least as important as information about true values in causing asset price changes, rendering the resale price uncertain. Because traders typically lack a terminal value from which to backwardize, they must not only form higher order expectations (i.e., on what others think others think) but also decide how much weight to assign them relative to what they themselves think the true value is (Hirota & Sunder 2003). Since no direct information exists on others' higher order expectations, traders have to infer that from a *technical* analysis of market trends, i.e., basically, the recent and current price changes.

For instance, if a trader observes that the price of an asset (or an asset group) which s/he thinks is already overvalued is still rising in price, s/he is led to surmise that either her/his opinion about the true value is wrong or that the price increase indicates a bubble, i.e., a self-sustained rise in price on account of noise trading driven by the average opinion thinking that the average opinion thinks the price will keep on rising. In either case, the current price changes are likely to gain in importance in how the trader forms his/her expectation about the future price, for it becomes either a proxy for the higher order expectations or a corrective on opinions about the true value, or, some combination of both. If so, the crucial variable that determines whether speculation is stabilizing or not very much depends on the relative weight traders assign to their higher order expectations (i.e., what they think others think others think) relative to their own assessment of what the true value is. To the extent that they do, they become more responsive to the current price change in forming their expectations about the future price. In Kaldor's (1939) formulation, whether speculation is stabilizing or not in this setting depends on the elasticity of future price expectations with respect to present price changes.<sup>5</sup>

If indeed the expected future price can be thought to comprise two parts, then we can write:

$$P^e = \bar{P} + \sigma \frac{dP}{dt}, \quad (2)$$

where  $\bar{P}$  is what the true value is believed to be (and is assumed constant for simplicity), and  $\sigma$  is the coefficient of elasticity of expectations about the future price with respect to the current changes in price.

Plugging (2) in (1) gives:

$$\frac{dP}{dt} = j[\bar{P} + \sigma \frac{dP}{dt} - P],$$

and rearranging we get;

$$\frac{dP}{dt} + \frac{j}{1 - \sigma j} P = \frac{j}{1 - \sigma j} \bar{P}$$

which, in turn yields the following time path of price;

$$P(t) = [P(0) - \bar{P}]e^{\frac{-j}{1-\sigma}t} + \bar{P}$$

The stability condition,  $\sigma < \frac{1}{j}$ , shows that stability depends on both the elasticity of expectations and the reaction speed. If the reaction speed is assumed instantaneous ( $j = 1$ ), as Kaldor seems to have implicitly assumed, a less than unitary elasticity of expectations ( $\sigma < 1$ ) ensures stability. In other words, destabilizing speculation can give rise to an asset price bubble only if traders revise their expected future price proportionally more than the change in current price. However, when the reaction speed is slower ( $j < 1$ ), the threshold value of  $\sigma$  exceeds unity.

One would expect both the reaction speed ( $j$ ) and the elasticity of expectations ( $\sigma$ ) to respond to changes in market opinion as to the degree to which asset prices are misaligned. As remarked above, if a trader observes that the actual price is well above what s/he thinks the true value is and still rising, s/he either begins to lose confidence in his/her own opinion on what is reasonable or think that asset price increases have acquired the character of a bubble. In either case, an increasing number of traders who might think alike will either leave the market or become much more responsive to current price movements in forming expectations about the future price - either *naively* as noise traders or *smartly* as speculators are presumed to do. In this setting, unlike what Friedman foresaw, successful (*read* rational) speculators are those who engage in 'trend' speculation, where they act like noise traders themselves in the short run, trying to feed the bubble rather than help deflate it (DeLong *et al* 1990).<sup>6</sup> Because the successful speculative strategy entails jumping on the bandwagon of noise traders and knowing when to get off while the rest rides on, this might also imply a rising reaction speed.<sup>7</sup> Thus, any sustained trend of a current price increase from what the market opinion generally holds to be the true value, whatever the cause, is likely to raise both the elasticity of expectations and the reaction speed. While this does not explain how initially prices become misaligned, it suggests speculation can become destabilizing once price deviations exceed in size and duration a certain threshold. Keynes' argument seems to assume that during the upswing, actual profits cannot increase at an increasing rate, while asset prices often will. Thus, sooner or later, optimistic expectations, and thus the asset prices that they underlie, outstrip the actual performance of profits. The latter, though still rising, eventually falls short of the former, but the bullish sentiment tends to persist.

Thus, Keynes' discussion on how asset prices behave over the business cycle, in his *Treatise*, seems to presuppose that speculation can both be stabilizing and destabilizing, depending on the phase of the cycle. As discussed in the previous section, Keynes argues that agents form expectations about the trend value of asset prices and the weighted average of these opinions tend to shift over the course of a business cycle expansion, which are then reflected in the changing size of the bear position in the economy. He stylistically divides the expansion phase of a business cycle into two parts, where the

preponderance of market opinion holds that asset prices are alternately undervalued and overvalued during the early and late periods of the cycle. While speculation is stabilizing in the former period it becomes destabilizing during late expansion, giving rise to a bubble. The latter period owes its existence, and is prolonged in duration, to the extent that the banking system expands the money supply by recycling the *bear* funds (bank deposits of those who have sold securities short) to those who still have a *bullish* sentiment that asset prices will continue to rise. If investment is still in excess of savings and output is thus expanding, it must be that the total money supply is increasing more than the increase in net hoarding.

Mean reversion in asset prices brings the expansion to an end. As suggested, the bear position develops in direct proportion to the deviation of actual prices from *true* values, and sets the stage for an abrupt fall in asset prices that can be triggered by any adverse piece of *news* (Zeeman 1974).<sup>8</sup> Once asset prices start falling, Keynes argued that they would overshoot in the opposite direction, touching off a ‘bear market with a consensus of opinion.’ With a contracting level of activity, the demand for liquidity rises on account of expectations that asset prices will continue to fall, offsetting at least in part the fall in transactions demand. Thus, whatever monetary relief there is in the form of a lower rate of interest rate to output contraction is likely to come about more on account of changed expectations about asset prices having hit bottom than because of a lower transactions demand associated with the decreased level of activity. Once the opinion that asset price have fallen more than sufficiently gains strength, the bear position begins to fall even when asset prices might still be falling. On the other hand, a more tranquil financial environment where a set of institutions anchor agents’ expectations could militate against wide fluctuations in asset prices by inculcating the belief that asset price misalignments are unlikely to become large. In that situation, a more gradual adjustment might be plausible, where the elasticity of expectations might negatively react to the perceived magnitude of the asset price misalignments over a longer period of time, as Kaldor (1939) thought was likely.

### **‘Two-Price’ Theory and the *GT***

While Hicks (1937) arguably stood Keynes’ *GT* on its head in his famous review article, he also appears to have identified quite clearly what was unique about his theory. This was in his opinion the notion that an increase in expenditures and income did not necessarily put an upward pressure on the interest rate. Hicks called this Keynes’ “special theory,” and distinguished it from the *GT* which in his view was closer to orthodoxy since Keynes’ argument there implied that - as his *IS/LM* formulation he believed made evident - an increase in expenditure led to a rise in the interest rate, all other things being equal (p. 152). The “special theory” Hicks was referring to is but the essential feature of the ‘two-price’ theory, whereby asset prices are determined independently of investment and saving flows.

According to Hicks’ yardstick, Keynes’ argument in his *Treatise* was already more “Keynesian” than the *GT*. In the earlier work, it was not just the elastic money supply

that kept the interest rate in check, but more importantly the fact that the state of bearishness (stock demand for financial assets) varied as a function of speculative expectations about asset price misalignments, exerting a *quantity* effect on inactive balances. As discussed in detail above, the bear position typically fell in the early phase of a business cycle expansion with optimistic asset price expectations, compensating the upward pressure put on the interest rate by the rising level of expenditure and income. Likewise, the period of late expansion was associated with the rising preponderance of market opinion that held that asset prices are excessive in relation to the actual earning performance of firms. That, in turn, caused the bear position to rise, making it harder for the banking system to accommodate rising levels of output without an increase in the interest rate.

On the face of it, translating the argument in the *Treatise* to the terminology of the GT seems to amount to the simple proposition that the liquidity preference schedule shifts down (up) when the marginal efficiency of capital shifts up (down) on account of more optimistic (pessimistic) expectations. In fact, Keynes appears to have made such a connection himself.<sup>9</sup> On closer examination, however, the suggested translation of the argument to the language of the GT is not as straight forward as it first appears. For one, in the GT, Keynes centered his whole argument of liquidity preference on the expected variations in the price of loan capital, and delineated the variations in share prices as a separate issue to be dealt with under the marginal efficiency of capital.<sup>10</sup> Asset price changes that would be brought about by changes in the interest rate, resulting from shifts in the portfolio choice between bonds and money, then became the focus of analysis. But, this also made it harder to conceptualize the macroeconomic effects of asset prices the market opinion held to be misaligned.

For the very concept of the marginal efficiency of capital, which as Keynes stresses is *fixed* by market valuation, implicitly precludes the notion of an asset price bubble. Note that if the marginal efficiency of capital shifts up on account of higher expectations of future profitability that are *justified*, then the initial increase in asset prices will cease to be excessive when actual investment and profits increase. Yet it is not clear how this case would be distinguished from a situation where the higher profit expectations are somehow *unjustified* or that the increase in asset prices are “excessive” in relation to these expectations, all other things again being equal. If investment rises with the higher marginal efficiency of capital as it should and the multiplier is what it is in both cases, then it is unclear how one could define market overvaluation, barring capacity or employment constraints.

Whether actual return on investment turns out to be less than or equal to what was expected, Keynes assumes that the expected rate of return on capital adjusts to the interest rate in equilibrium through variations in the scale of investment (Keynes 1936, p. 178). As Keynes put it after the GT, “the necessity of equalizing the advantages of the choice between owning loans and assets requires that the rate of interest should be equal to the marginal efficiency of capital. But this does not tell us at what level the equality will be effective. The orthodox theory regards the efficiency of capital as setting the pace...(…) Thus, instead of the marginal efficiency of capital determining the rate of

interest, it is truer (though not a full statement of the case) to say that it is the rate of interest which determines the marginal efficiency of capital” (CW JMK XIV, pp. 122-3). This formulation, combined with the shift to equilibrium analysis, left no room for the shifts in market opinion about asset price misalignments to play any role in the argument. The whole issue was then put on the back burner as Keynes defined his short term in terms of a given set of long term expectations, which was understood to mean that future profit expectations that underlay equity prices were assumed constant within his short period. This placed the whole emphasis on the present value of these expected future stream of profits that changed with the money rate of interest.

Secondly, in the reformulated version of his liquidity preference argument as a theory of the interest rate, Keynes remarks that “...what matters is not the absolute level of  $r$  [the interest rate] but the degree of its divergence from what is considered a fairly safe level of  $r$ , having regard to those calculations of probability which are being relied on” (Keynes 1936, p. 202). Though Keynes accepts that this ‘safe’ rate can itself vary from time to time, he takes this to be the exception rather than the rule. Thus, if the safe rate is expected to remain unchanged, he remarks that every decrease (increase) in the current interest rate increases the expectation that bond prices will fall (rise) in the future, and thus raising (lowering) “the risk of illiquidity.” As Kaldor (1939) later elaborated, in this situation even a very small change in bond prices would be sufficient to induce speculators to buy the new bonds firms issue, since they would be expecting the bond prices to rise in the future, as long as their expectations with respect to the long rate remained inelastic.<sup>11</sup>

Note that here the bearish (bullish) sentiment now refers to the heightened (reduced) sense of risk associated with illiquidity, as the focus of the argument moves from shifts in the liquidity preference function as a whole to variations in the demand for liquidity when the said function remains unchanged. By contrast, when Keynes refers to a shift in liquidity preference as a result of the collapse in the marginal efficiency of capital in his chapter on the trade cycle – referred to above – he means a shift in the whole schedule and presumably a change in what is considered a safe rate as well. But, if the liquidity preference varies with shifts in the marginal efficiency of capital, it is harder to derive an interest elastic money demand schedule on the basis of the speculative motive, for it is then less plausible that expectations about the ‘safe’ rate are inelastic. In this setting, the only type of asset price bubble that can ever occur is that in bond prices, caused potentially by an aggressively expansionary monetary policy that brings about too steep a fall in the current rate of interest in relation to the ‘safe’ rate. The *liquidity trap* that can result in this instance is reminiscent of Keynes’ *bull market with a division of opinion* in the *Treatise*, though, its scope is much more limited.

### **After the GT**

The ‘finance’ debate that broke out after the publication of the GT was essentially a continuation of the disagreement Robertson had with Keynes in 1931. Above, I argued that this exchange was in fact about two separate issues – one, about consistency in

macro accounting and, the other, on economic behavior - that were entangled together, and suggested that the former detracted attention from the more important disagreement with respect to the latter involving Keynes' 'two-price' theory. The 'accounting debate' almost completely crowded out the other one after the GT, where Keynes redefined investment and savings and insisted that they were separate but always equal. Agreement first had to be reached on expressing 'investment-saving' disequilibrium in terms of the discrepancies between *intended* and *actual* magnitudes, with all the attending confusion about what *intended* savings meant, but otherwise it was the old 'accounting debate' all over again. In 1931, the issue was the connection between excess savings and increased hoarding (i.e., in the absence of a fall in the money supply); after the GT, it became a debate about what the corollary of an increase in 'intended' investment was. A rise in the money supply was ruled out by assumption and "dishoarding" had an immediate price effect by definition. Thus, this time around, the whole debate could only be framed from the 'money demand' side and focus on the pressure an increase in planned expenditures would exert on the interest rate. In his exchanges with his critics, including Robertson among others, Keynes (1937a, 1937b, 1937c, 1938) had to concede that a rise in planned investment would also raise the demand for money prior to its execution, and, thus, all other things being equal, the interest rate. He emphasized banks' overdraft facilities to argue that this effect on the interest rate would not amount to much in practice. Decades later, in another round of "finance" debate an article by Asimakopulos (1983) set off, it was in a similar vein accepted that additional bank finance would be required until the multiplier process worked itself out, generating enough savings to equal the higher level of investment (Chick 1983, 1997).

Thus, in both debates, the increased 'planned' expenditures were linked to a prospective increase in the money supply, but that did little to bring into focus the more important debate about economic behavior. On the contrary, the focus on the accounting problem in both have placed the emphasis on the so-called finance demand as a separate motivation to hold money, and that appears to have weakened the essential aspect of Keynes' 'two-price' theory. In Davidson's (1978) well-known incorporation of the idea into the IS-LM model, an increase in planned investment not only shifts up the IS schedule but the LM schedule as well, causing the interest rate to go up faster and sooner whenever the level of activity rose. Of course, the verbal explanation of why the interest rate rises was very different than Robertson's 'loanable funds' account, but the end result was the same in obliterating whatever remained intact from "Keynes' special theory." One outcome of this, it appears, was to dampen interest on Liquidity Preference among heterodox economists. Keynes' disciples at Cambridge had found little of interest in the *Treatise* and by and large ignored monetary theory all along anyway (Kregel 1985), while others who retained an interest came to believe that Liquidity Preference was an irrelevant diversion once an elastic money supply was not ruled out by assumption as Keynes did (Kaldor 1981, 1982, Dow and Dow 1989, Lavoie 1992, Ch. 4).<sup>12</sup> Those who tried to retain a role for Liquidity Preference (Kregel 1988, Wray 1990), tended to shift its emphasis away from monetary circulation onto its impact on the structure of asset prices (Wells 1983, Kregel 1984-5 and Mott 1985-6), reviving a line of thought that went back to Townshend (1937) and Boulding (1944).<sup>13</sup>

As the 'two-price' view was thus lost sight of, Minsky (1975) had to reemphasize that Keynes was essentially about "an investment theory of fluctuations in real demand and a financial theory of fluctuations in real investment" (p. 57). In re-emphasizing the essential feature of the 'two-price' view, he remarked that changing views about the future influence the present through their impact on the current asset prices, which in turn determine the profitability of producing investment goods with a given cost structure in the present period. Any decision to acquire real capital assets, as he was keen to emphasize, is inherently a speculative one as it bequeaths the firm with a certain liability structure that give rise to cash flow obligations far into the future, while generating future earnings that are never certain. Yet, despite his emphasis on the speculative character of investment decisions, Minsky paid little attention to asset price speculation *per se*, ignoring asset price bubbles and their macroeconomic effects on monetary circulation. Perhaps, this was understandable. His views were formed during the era of financial regulation, when speculation "could do no harm as bubbles on a steady stream of enterprise," unlike the present era where Keynes' old warning that the situation "...is serious when enterprise becomes the bubble on a whirlpool of speculation" rings true again.

## Conclusion

This essay has highlighted Keynes' early insights on asset price speculation and its link to monetary circulation, perhaps, at the risk of downplaying the importance of the GT. A part of Keynes' analysis in the *Treatise* which emphasized the importance of financial conditions and asset prices in determining firms' investment decisions was later revived by Minsky,<sup>14</sup> but another part about the way self-sustained biases in asset price expectations in financial markets exerted their influence over the business cycle was mainly forgotten. In his famous QJE article, Keynes (1937a) talked about how people tend to fall back on conventions in forming expectations about an uncertain future in financial markets, and emphasized how valuations can change drastically and violently because doubts of panic have a life of their own close to the surface. In the *Treatise*, the changing size of the bear position was the very index of what was brewing under the surface, of what he called the 'other view.' It provided a convenient setting for analyzing the macroeconomic effects of asset prices the preponderance of market opinion held to be misaligned in a way that became impossible to do in the GT for at least two main reasons. First, the reformulation of Liquidity Preference as a theory of the interest rate ruled out by assumption that changes in the 'bear' sentiment could have first and foremost *quantity* effects on the size of inactive money balances. Second, separating the determination of prices of assets and from those of debts, Keynes defined his 'short period' in terms of a given set of expectations with respect to firms' future earnings expectations. While this had the advantage of highlighting the potential of economic policy – to the extent interest rates could be controlled – in influencing asset prices, it at the same made it harder to conceptualize the macroeconomic effects of speculation and asset prices the market opinion held to be misaligned. Finally, any hint of an interaction between Liquidity Preference and Marginal Efficiency of Capital was further weakened as the focus of the former has over time moved away from shifts in the function as a whole to variations in the demand for liquidity when the said function remained unchanged. Then, as the

interest elasticity of the transaction demand (Tobin 1956, 1958 and Baumol 1952) soon took the center stage, whatever link that still existed between Liquidity Preference in the GT and the 'state of bearishness' argument of the *Treatise* was completely lost. Asset price speculation no longer had any foothold in Keynesian macroeconomic theory. Thus, paradoxically, despite its strong emphasis on unpredictable shifts in market psychology, GT unleashed a process of intellectual evolution where at the end it became harder to say anything determinate about the monetary effects of market speculation and asset price misalignments.

Notes:

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<sup>1</sup> In his haste to make the point that excess savings and increased hoarding were not one and the same, Keynes appears to have caused confusion by insisting that over-saving had no particular relation to increased inactive balances unless the banking sector chose to supply a higher amount of saving deposits, without however indicating that what he took as his *default* case was an endogenous fall in the supply of money. Though, technically, excess savings can be associated with neither a fall in the money supply nor increased net hoarding in a given period if “non-GDP” transactions increase inordinately relative to those on the currently produced output, but this cannot be generally the case.

<sup>2</sup> Ironically, the ‘efficient market hypothesis,’ which the detractors of Keynes were quick to embrace, also presupposes that the current asset prices are solely determined by their expected future prices independently of outside supply and demand.

<sup>3</sup> As Cottrell (1994) remarks in his review of Littleboy (1990), Leijonhufvud (1968, 1981, Ch. 7) has two very different interpretations of Keynes in his works, where one is a neo-Walrasian variation on Clower’s notion of effective demand, and the other is a theory of intertemporal investment – saving disequilibrium caused by bear speculation. The discussion here refers solely to the latter interpretation. On Leijonhufvud’s work, also, see Cottrell and Lawlor (1991).

<sup>4</sup> The more elaborate support for this position is based on ‘the efficient market hypothesis,’ which has gained currency among economists after Samuelson’s (1965) “proof” that in a market that is *efficient* in appropriating all available information stock prices should exhibit a random walk and Fama’s (1965) demonstration that they almost actually do. But, neither proposition is considered valid any longer in the contemporary finance literature. Empirically, it is shown that stock prices do not exhibit random walk, and theoretically it is shown that *unforeseeable* prices are neither necessary nor sufficient for *rationally* determined stock prices. See, among others, Lo & MacKinlay (2002), Bossaerts (2002) and Shleifer (2000).

<sup>5</sup> See also Hicks (1946, pp. 205-6).

<sup>6</sup> In the modern finance literature on asset price bubbles the emphasis, until recently, was on rational traders’ risk aversion which was thought to prevent them from eliminating noise driven price movements. However, the focus has been shifting to ‘trend’ speculation as the winning strategy for speculators, a fact well known to market participants all along (Soros 1987. Temin and Voth 2004).

<sup>7</sup> I owe this point to a suggestion by Amit Bhaduri.

<sup>8</sup> In an interesting finding, Cutler *et al* (1991) report positive autocorrelation at high frequencies and negative serial correlation at longer time horizons exceeding fourteen months for a broad class of financial assets, including stocks, bonds and foreign exchange from around the world.

<sup>9</sup> In Chapter 22 of the GT, liquidity preference schedule shifts up only after the marginal efficiency of capital collapses, setting off a downturn. In Keynes (1937a), there is more a sense of an ongoing interaction between the two schedules, where he writes, “When a pessimistic view taken about future yields, that is no reason why there should be a diminished propensity to hoard. Indeed, the conditions which aggravate the one factor tend, as a rule, to aggravate the other. For the same circumstances which lead to

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pessimistic views about future yields are apt to increase the propensity to hoard” (CW, XIV, p. 118).

<sup>10</sup> “Whilst liquidity-preference due to the speculative-motive corresponds to what in my *Treatise on Money* I called “the state of bearishness”, it is by no means the same thing. For “bearishness” is there defined as the functional relationship, not between the rate of interest (or price of debts) and the quantity of money, but between the price of assets and debts, taken together, and the quantity of money. This treatment, however, involved a confusion between results due to a change in the rate of interest and those due to a change in the schedule of the marginal efficiency of capital, which I hope I have here avoided. (Keynes 1936, p. 173-4).

<sup>11</sup> In my view, Leijonhufvud (1968, 1981) erroneously reads this aspect of the argument in the GT into the *Treatise*.

<sup>12</sup> Kaldor (1982, p. 26) was to retort, “liquidity preference turns out to have been a bit of a red herring,”

<sup>13</sup> For more recent attempts at reconciling liquidity preference with endogenous money, also, see: Dow & Chick (2002) and Brown (2003-4).

<sup>14</sup> Though, oddly enough, Minsky never mentions the *Treatise* as the source of his ‘two-price’ theory in any of his writings that I am aware of. However, this connection is emphasized in Kregel (1992), referred to above.

References:

- Asimakopulos, A. (1983). "Kalecki and Keynes on Finance, Investment and Savings," *Cambridge Journal of Economics*, 7, pp. 221-33.
- Baumol, W.J. (1952). "The Transaction Demand for Cash: An Inventory-Theoretic Approach," *Quarterly Journal of Economics*, 7, pp. 545-56.
- Bibow, J. (2001). "The Loanable Funds Fallacy: Exercises in the Analysis of Disequilibrium," *Cambridge Journal of Economics*, 25, pp. 591-616.
- Bibow, J. (2000). "The Loanable Funds Fallacy in Retrospect," *History of Political Economy*, 32(4).
- Black, F. (1986). "Noise," *Journal of Finance*, July, 41, pp. 529-43.
- Bossaerts, P. (2002). *The Paradox of Asset Pricing*. Princeton, NJ: Princeton University Press.
- Boulding, K. (1944). "A Liquidity Preference Theory of Market Prices", *Economica*, 11, pp. 55-63.
- Brown, C. (2003-4). "Toward a Reconciliation of Endogenous Money and Liquidity Preference," *Journal of Post Keynesian Economics*, 26, pp. 325-39.
- Chick, V. (1997). "The Multiplier and Finance," in G.C. Harcourt and P.A. Riach (eds.) *A 'Second Edition' of The General Theory*, Vol. 1, London: Routledge.
- Chick, V. (1983). *Macroeconomics After Keynes*. Cambridge, MA: The MIT Press.
- Clower, R. (1999). "Post-Keynes monetary and financial theory," *Journal of Post Keynesian Economics*, 21(3), 399-414.
- Cottrell, A. (1994). "Reconciling Leijonhufvud and the Post Keynesians," *Research in the History of Economic Thought and Methodology*, 12, pp. 223-32.
- Cottrell, A. and M.S. Lawlor (1991). "'Natural Rate' Mutations: Keynes, Leijonhufvud and the Wicksell Connection," *History of Political Economy*, 23(4), pp. 625-43.
- Cutler, D., Porteba, J. & L. Summers (1991). "Speculative Dynamics," *Review of Economic Studies*, 58(3), May, pp. 529-46.
- Davidson, P. (1978). *Money and the Real World*, Macmillan.

- De Long, J.B., Schleifer, A., Summers, L., & R. Waldmann (1990a). "Noise Trader Risk in Financial Markets," *Journal of Political Economy*, 98(4), August, 703-38.
- Dow, S. & V. Chick (2002). "Monetary Policy with Endogenous Money and Liquidity Preference: A Nondualistic Treatment," *Journal of Post Keynesian Economics*, 24, pp. 587-607.
- Dow, A. & S. Dow, S. (1989). "Endogenous Money Creation and Idle Balances", in Pheby, J. (ed.): *New Directions in Post-Keynesian Economics*, Edward Elgar, Aldershot.
- Ellis, H. (1934). *German Monetary Theory, 1905-33*. Cambridge, MA: Harvard University Press.
- Erturk, K. (2005). "Asset Price Bubbles, Liquidity Preference and the Business Cycle," Forthcoming in *Metroeconomica*.
- Fama, E. (1965). "The Behavior of Stock Market Prices," *Journal of Business*, 38, pp. 34-105.
- Friedman, M. (1953). "The Case for Flexible Exchange Rates," *Essays in Positive Economics*, Chicago: Chicago University Press.
- Hicks, J.R. (1946). *Value and Capital: An Inquiry into Some Fundamental Principles of Economic Theory*. 2<sup>nd</sup> Edition. Oxford: Oxford University Press.
- Hirota, S. & S. Sunder (2003). "Price Bubbles sans Dividend Anchors: Evidence From Laboratory Stock Markets," Working Paper. Posted at: <http://www.som.yale.edu/faculty/Sunder/research.html>
- Kaldor, N. (1982): *The Scourge of Monetarism*. Oxford University Press, Oxford.
- Kaldor, N. (1981): *Origins of the New Monetarism*. University College Cardiff Press, Cardiff.
- Kaldor, N. (1939). "Speculation and Economic Stability," *The Review of Economic Studies*, October.
- Keynes, J.M (1973) [1923]. *A Tract on Monetary Reform* in Moggridge, D.E. (ed.): *Collected Writings of J.M. Keynes*, (CW), vol. IV, Macmillan for The Royal Economic Society, London.
- Keynes, J.M. (1973) [1930]. *A Treatise on Money*, vol. I, in Moggridge, D.E. (ed.): *Collected Writings of J.M. Keynes*, (CW), vol. V, Macmillan for The Royal Economic Society, London.

- Keynes, J.M (1973). *Collected Works of J.M. Keynes*, vol. XIII, edited by D.E. Moggridge, Macmillan for The Royal Economic Society, London.
- Keynes, J.M (1973). *Collected Works of J.M. Keynes*, vol. XIV, edited by D.E. Moggridge, Macmillan for The Royal Economic Society, London.
- Keynes, J.M (1973). *Collected Works of J.M. Keynes*, vol. XXIX, edited by D.E. Moggridge, Macmillan for The Royal Economic Society, London.
- Keynes, J.M. (1964) [1936]. *The General Theory of Employment, Interest, and Money*, Harcourt Brace Jovanovich, New York.
- Keynes, J.M. (1938). "Mr. Keynes on 'Finance,'" *Economic Journal*, 48, pp. 318-22.
- Keynes, J.M. (1937a). "General Theory of Employment," *Quarterly Journal of Economics*, 51, pp. 209-23.
- Keynes, J.M. (1937). "Alternative Theories of the Rate of Interest," *Economic Journal*, 47, pp. 241-52.
- Keynes, J.M. (1937c). "'Ex-Ante' Theory of the Rate of Interest," *Economic Journal*, 48, pp. 663-9.
- Kregel, J. (1992). "Minsky's "Two Price" Theory of Financial Instability and Monetary Policy: Discounting versus Open Market Intervention," F. Steven and D.B. Papadimitriou, (eds). *Financial conditions and macroeconomic performance: Essays in honor of Hyman P. Minsky*. 85-103, Armonk, N.Y. and London: Sharpe.
- Kregel, J. (1985). "Hamlet without the Prince: Cambridge Macroeconomics without Money," *American Economic Review*, Papers and Proceedings, May, 75, pp. 133-139.
- Kregel, J. (1984-5). "Constraints on the Expansion of Output and Employment: Real or Monetary?," *Journal of Post Keynesian Economics*, 7, pp. 139-52.
- Lavoie, M. (1992). *Foundations of Post-Keynesian Economic Analysis*. Edward Elgar, Aldershot.
- Leijonhufvud, A. (1981). "The Wicksell Connection," Chp. 8 in *Information and Coordination*.
- Leijonhufvud, A. (1968). *Keynesian Economics and the Economics of Keynes*.
- Littleboy, B. (1990). *On Interpreting Keynes: A Study in Reconciliation*. London and New York: Routledge.

- Lo, A.W. & A.C. MacKinlay (1999). *A Non-Random Walk Down Wall Street*. Princeton: Princeton University Press.
- Minsky, H. (1975). *John Maynard Keynes*. New York: Columbia University Press.
- Mott, T. (1985-6). "Towards a post-Keynesian Formulation of Liquidity Preference," *Journal of Post Keynesian Economics*, 8, pp. 222-32.
- Robertson, D.H. (1931). "Mr. Keynes' Theory of Money," *Economic Journal*, September.
- Samuelson, P. (1965). "Proof that Properly Anticipated Prices Fluctuate Randomly," *Industrial Management Review*, Spring, 6, pp. 41-9.
- Shleifer, A. (2000). *Inefficient Markets. An Introduction to Behavioral Finance*. Oxford: Oxford University Press.
- Shleifer, A. & L.H. Summers (1990). "Noise Trader Approach to Finance," *Journal of Economic Perspectives*, 4(2), Spring, pp. 19-33.
- Shleifer, A. & Vishny, R. (1997). "The Limits of Arbitrage," *Journal of Finance*, 52(1), March, pp. 35-55.
- Soros, G. (1987). *The Alchemy of Finance: Reading the Mind of the Market*. New York: Simon & Schuster.
- Temin, P. & H. Voth (2004). "Riding the South Sea Bubble," CEPR Discussion Paper 4221.
- Tobin, J. (1956). "The Interest-Elasticity of the Demand for Cash", *Review of Economics and Statistics*, 38, pp. 241-7.
- Tobin, J. (1958). "Liquidity Preference as Behavior Toward Risk," *Review of Economic Studies*, 67, pp. 65-86.
- Townshend, H. (1937). "Liquidity Premium and the Theory of Value," *Economic Journal*, 47, pp. 157-69.
- Wells, P. (1983). "A Post Keynesian View of Liquidity Preference and the Demand for Money," *Journal of Post Keynesian Economics*, 5, pp. 523-36.
- Wicksell, K. (1906), *Lectures on Political Economy*, Vol.2.
- Zeeman, E.C. (1974). "On the Unstable Behaviour of Stock Exchanges," *Journal of Mathematical Economics*, 1, pp. 39-49.