

## **Monetary Equilibrium and the Stockholm School**

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## I. Introduction

During the last two decades, there has been an increasing amount of research into the question of the role of money in economic activity. R. M. Clower, in the editorial introduction to the Penguin collected readings Monetary Theory, writes that “contemporary monetary theory is among the least-settled branches of economic analysis ... and that “the literature of monetary theory overlaps on virtually every other branch of economic analysis ...” (7). Considering the wide range of points of view expressed by the authors in this volume, it appears that the “monetary question” will not be answered definitively for some time.

In this paper, we will analyze the contributions of the Stockholm School of economics to monetary theory, particularly the contributions to be found in Gunnar Myrdal’s book, Monetary Equilibrium. Myrdal and his colleagues developed their monetary theories as an immanent criticism of the monetary theory of Knut Wicksell and David Davidson, the founder editor of the Swedish Ekonomisk Tidskrift. We will follow the development of Myrdal’s monetary model and compare it with contemporary monetary models.

The paper proceeds as follows. In section II we place Myrdal’s theoretical contributions in their context as part of the Stockholm School of economics. In section III we develop Myrdal’s monetary model, and in Section IV we compare his model with some contemporary monetary models.

## II. The Stockholm School

The Stockholm School of economics was christened by Bertil Ohlin in two articles which appeared in the Economic Journal in 1932. These articles were written in reaction to J.M. Keynes’ publication of the General Theory of Employment, Interest and Money. Erik Lindahl, Erik Lundberg, Gunnar Myrdal and Bertil Ohlin were the most prominent members of the school. The birth of the school coincided with Myrdal’s doctoral dissertation, Prices and the Change Factor (1927). Its progenitors were Gustav Cassel, David Davidson and Knut Wicksell.

According to Ohlin, three theoretical concepts were important to the development of the Stockholm School. The first concept, due to Wicksell, was the “aggregate demand-supply approach—emphasizing the relation of investment to savings—to changes in value and associated changes in tempo and scope of economic activity

which find expression in fluctuations of price levels, income, and employment” (Uhr 700). Wicksell rejected Says law—that supply creates its own demand—and the resulting bifurcation of theoretical economic analysis into the theory of relative prices and the theory of money.

The second concept, presented by Myrdal in 1927, was the incorporation of expectations into economic theory. He is credited with distinguishing between *ex ante* (looking forward) and *ex post* (looking backward) variables in dynamic economic analysis.

The third concept, first alluded to by Myrdal (1927), but developed by Lindahl (1929), and extended by Lundberg (1936) and Hicks (1939) was the “method of analyzing a dynamic process as a series of equilibria, between which there occur unforeseen events with consequent gains or losses” (Lindahl, 11). This is the concept of temporary equilibrium popularized by Hicks among English speaking economists in Value and Capital.

These concepts were developed in order to extend and amend the monetary theory inherited from Wicksell. The new theoretical base was then used by Swedish economists as a guide in implementing various government policies in the depression years of the early thirties.<sup>1</sup>

### III. Monetary Equilibrium

#### A. Knut Wicksell: Three Conditions for Monetary Equilibrium

In the Introduction to the 1936 English translation of Wicksell’s Interest and Prices, Ohlin states that the cornerstone of Wicksell’s monetary was “the idea that if the money rate coincided with a normal rate of interest, which brought about equality between savings and investment, the commodity price level would remain constant” (xix). The absence of a cumulative process was equivalent to the existence of a monetary equilibrium. Monetary equilibrium was obtained in the economy if the “money rate of interest” was equal to the “normal rate of interest”.

In Monetary Equilibrium, Myrdal claimed that Wicksell’s “normal rate of interest” had to satisfy three mutually consistent and equivalent criteria:

1. equal the marginal technical productivity of real capital (i.e., the “real” or “natural” rate of interest);
2. equate the supply of and demand for savings; and

3. guarantee a stable price level, primarily of consumption goods (37).

Wicksell arrived at these criteria because of his dissatisfaction with the quantity theory of money, his belief that the rate of interest was usually low during periods of falling prices and high during periods of rising prices, and his studies of Austrian capital theory, particularly his revision of Böhm-Bawerk's theory of interest based on the concept of roundabout methods of production.

Wicksell bridged the gap between price theory and monetary theory with the realization that a rise in the general price level is due to a rise in aggregate demand relative to aggregate supply. This concept was a significant aspect in later years for Keynesian economics. Total supply consists of the supply of consumers' goods plus the supply of capital goods; total demand consists of the portion of income spent on consumers' goods plus the investment in capital goods.

The variability of investment demand in relation to the portion of income that is saved would result in a divergence between aggregate demand and aggregate supply, causing the general price level to rise or fall. Investment demand, or the demand for savings, depended on the relation between the "money rate" and the "real rate" of interest. A deviation between these two rates would initiate a cumulative process.

Wicksell assumed the existence of a pure credit economy in which money's velocity of circulation is not constant. Therefore "the 'supply of money' is perfectly elastic and, subject to the central bank discount rate, adapts itself perfectly to the demand for money" (Uhr 702). With this assumption, Wicksell "successfully escaped from the tyranny which the concept 'quantity of money' has ... exercised on monetary theory" (Ohlin, xiv).

We must still define what is meant by the presence of a cumulative process. Myrdal writes that a cumulative process is "a departure from a position of equilibrium. The essential feature of the process is a shift in production which brings with it an increased production of real capital if the dynamic process has an upward direction, and a decreased production if the process has a downward trend ... Savings either fall short of or exceed real investment, and prices are slowly forced wither upward or downward" (34).

Not until the equilibrium conditions are re-established will the general price level be stabilized.

## B. Myrdal: The Yield of Real Capital

Although he modified his analysis in his later writings, Wicksell related the “real” or “natural” rate of interest to the marginal productivity of real capital. The productivity of capital was the result of the roundabout process of production in a pure barter economy (an economy devoid of any monetary transactions). The time preferences of the economic agents, perfect competition, free factor mobility and the productivity of capital plus a non-stationary barter economy imply the development of a “uniform time agio ... throughout the whole system of price formation” (Myrdal, 1962, 50). The interest factor in exchange relations existing between two points in time would be the “real” interest rate for that time period which “would reflect the marginal physical productivity of the time factor under given technical functions and other primary factors determining the system” (50).

Myrdal criticized Wicksell for comparing the “real” interest rate (in a barter economy) with the rate of interest on money.<sup>2</sup> In an economy with monetary transactions, particularly money time contracts, the process of price formation is influenced by the rate of exchange of the monetary unit with respect to other commodities at different points in time. Thus, the construction of the real rate of interest cannot proceed independently of credit conditions and the money rate of interest. Prices, money interest rates and the value of the yield of real capital are simultaneously determined.

To elucidate Myrdal’s criterion for calculating the yield on capital define variables:

$r(t)$  = expected gross return in period  $t$ ,

$c(t)$  = expected gross operating cost in period  $t$  attributed to the co-operating means of production,

$i(t)$  = money interest rate expected to prevail in period  $t$ ,

$p(t)$  = expected net operating return in period  $t = r(t) - c(t)$ .

The expected value of capital,  $V(n)$ , at the start of period  $n$  over its usage until the  $N^{\text{th}}$  period is calculated by:

$$(1) V(n) = \sum_{t=n}^N (p(t) / \prod_{s=0}^t (1 + i(s))).$$

The expected net return,  $e(n)$ , at the start of period  $n$ , for the  $n^{\text{th}}$  period, is:

$$(2) e(n) = [p(n) - (V(n) - V(n+1))] / (1 + i(n)).$$

The expected net return for the  $n^{\text{th}}$  period is the expected net operating return, minus the expected change in the value of capital from the beginning to the end of the period due to physical depreciation and/or expected changes in economic conditions, discounted to the start of the period. The expected change can either be positive or negative. It is easy to determine that equation (2) can be rewritten as:

$$(3) e(n) = V(n) i(n) / (1 + i(n)).$$

The expected yield on existing capital at the start of period  $n$  is given by:

$$(4) y(n) = e(n) / V(n) = i(n) / (1 + i(n)).$$

Thus, the expected yield on existing real capital is equal to the expected yield on money invested at the expected money rate of interest.

If  $I(n)$  is the expected cost of production of investment at the start of period  $n$  (discounted if necessary), then the expected yield on planned investment at the start of period  $n$  is given by:

$$(5) y(n) = e(n) / I(n) = V(n) i(n) / [I(n) (1 + i(n))].$$

From equation (5), one can determine that the expected yield on new investment is greater than, equal to, or less than the expected yield on money if, and only if, the expected value of new investment is, respectively, greater than, equal to, or less than the expected cost of new investment.<sup>4</sup>

We recall that Wicksell's first condition of monetary equilibrium was that the "real" rate of interest must equal the money rate of interest. By incorporating expectations, the first condition in Myrdal's analysis becomes that the expected yield of planned investment in real capital must equal the yield on money (invested at the money interest rate).

An equivalent condition is that the value of planned investment must equal the cost of planned investment. The difference between the expected value and cost of planned investment (expected investment gains) "form the profit motive in the course of Wicksell's dynamic process" (61).

Wicksell's assumption that free competition prevailed in the economy implies that all entrepreneurs perceive the same yield on planned investment and face the same interest rate on money. In a heterogeneous economic system, it appears reasonable that in different branches of the economy, firms will not only experience different values for  $V(n) - I(n)$ , the difference between expected value and cost of planned

investment, but also will react differently for equal perceived values of  $V(n) - I(n)$ . To determine whether the economy as a whole does exhibit the conditions of monetary equilibrium, it is necessary to devise some index which will weight the values of  $V(n) - I(n)$  in each branch of the economy “with regard to its effects on the amount of real investment, measured in cost of production.” Furthermore, “the weights must be different for different branches of the economy, and they must depend of the sign, the size and the direction of movement of the profit margin  $V(n) - I(n)$ , and on the general business cycle situation of the economy as a whole” (78).

The weight or investment-reaction coefficients,  $w$ , are interpreted as average elasticities of investment with respect to the profit margin,  $V(n) - I(n)$ . Let:

$$Q = \sum_w (V(n) - I(n)),$$

where we aggregate over all branches of the economy. Wicksell’s first condition of monetary equilibrium becomes:

$$Q = 0.$$

But why should this aggregate zero-profit condition be necessary for the existence of monetary equilibrium? In a dynamic economy (as opposed to a stationary state or a steady-state economy), techniques, tastes, and resources are changing.

Consequently, relative prices are changing from one period to another. Not only is it impossible to distinguish between new investment and reinvestment, but also, there is usually some saving and new investment going on in some branch of the economy.

Therefore, in a dynamic economy “we come to the conclusion that the basic idea of identifying monetary equilibrium with a zero-profit situation cannot be upheld” and the formula  $Q = 0$  “must be remodeled in order to correspond to the implicit function of the (monetary) equilibrium concept in Wicksell’s monetary theory” (82). Myrdal concludes that we must look to Wicksell’s second formula, which describes the capital market, in order to derive the conditions for monetary equilibrium.

However, we have derived the equation for one term in the second equilibrium condition. The desired amount of investment for a given firm is a function the expected investment gain, the profit margin  $V(n) - I(n)$ . The form of the function depends on the firm’s investment-reaction coefficient. If we aggregate the desired

amount of investment over all the branches of the economy, we get the total quantity of planned investment, the demand for savings (income not spent on consumer goods), for a given state of the economy.

### C. Myrdal: Saving and Investment – The Capital Market

Wicksell's second condition for monetary equilibrium was that the money rate of interest equate the supply of and demand for savings (i.e. equate "saving" and "investment"). Myrdal thought that this condition was obscure, in that Wicksell never adequately defined the terms "saving" and "investing". Although Myrdal concurred with Wicksell on the idea that saving and investment are not identical and thus can be compared, he also criticized Wicksell for not emphasizing the idea more explicitly. Saving should not be confused with real capital formation, but should be defined as that part of income "which is not used in the demand for consumption goods" (90). This definition of saving was used later in Keynesian economics.

Myrdal writes that:

Wicksell's argument then is that saving and real capital formation are not necessarily linked together; intermediate between the decision of the saver not to consume his whole money income and the decision of the entrepreneur to make real investments with his own or someone else's capital, is the whole process of price formation, particularly all those relations of price formation which are studied in monetary theory (90).

It is important to note that next expected return as defined by equation (2) is synonymous with the discounted value of income. Thus, income for the nth period is defined by:

$$(6) \quad a(n) = p(n) - (V(n) - V(n+1)).$$

Present income depends on future price and quantity expectations and on the imputation of expected returns to the current and future time periods. The amount of income available for planned saving and consumption is subjectively determined according to an agent's expectations, although the agent's expectations may be partially based in objective facts.



It has been shown (B above) that the quantity of planned investment (measured by the cost of production),  $R$ , was a function of expected investment gains occurring throughout the economy, while the value of planned investment was a function of the state of expectations and the money rate of interest. For equilibrium to prevail in the capital market, the gross real investment,  $R$ , must be balanced by “free capital disposal”,  $W$ . One component of free capital disposal must obviously be saving proper,  $S$ . The other component is the anticipated value-change of capital in the current time period, depreciation minus appreciation,  $D$ . This corresponds to the term,  $V(n) - V(n+1)$ , in the definition of income in equation (6). Capital disposal is “free”.

Myrdal writes:

From the standpoint of the private entrepreneur in the sense that, aside from the saved part of his income, and without selling or mortgaging his real capital, he can dispose of exactly such a part of invested property value as corresponds to the amount of appreciation minus depreciation.

The entrepreneur evaluates the value change of capital on the same basis as saving,  $S$ , given his ability to borrow or lend money at the money rate of interest. Thus, the condition for monetary equilibrium is that the money interest rate equate gross real planned investment and free capital disposal, i.e.,  $R = W = S + D$ .

Through the use of the above concepts, it is possible to analyze the effect changes in expectations and/or the money interest rate will have on the tendencies of the economy at a given point of time.

Myrdal writes:

The dynamic problem proper concerns the development from one point of time to a second and a third and so on. Since periods of time are defined as the interval between two points of time, it is obvious that instantaneous analysis at points of time is not only preliminary to a complete solution of the dynamic problems involved, but is also necessary as a basis for the further analysis of these problems (43).

The focus on an “analysis of instantaneous situations”<sup>5</sup> enabled Myrdal to base his model on more realistic situations. Although some theorists have criticized Myrdal’s approach as not being sufficiently dynamic, Myrdal’s disequilibrium method—the comparison of the *ex ante* discrepancies existing between the plans of all the relevant economic agents at a given point in time—is often sufficient for

economic policy decisions.<sup>6</sup> The starting point in this analysis can be either a state of monetary equilibrium or disequilibrium—the presence or absence of a cumulative process.

First, consider the case where monetary equilibrium is disturbed, *ceteris paribus*, by lowering the current money rate of interest. The equation for calculating the value of capital,  $V(n)$ , at the start of period  $n$  can be rewritten as:

$$(7) V(n) = (p(n) + V(n+1)) / (1 + i(n)).$$

It is clear that a decrease in the current money interest rate,  $i(n)$ , will increase the value of real capital,  $V(n)$ . The profit margins,  $V(n) - I(n)$ , will increase and there will be a tendency for gross real investment,  $R$ , to increase.

The equation for expected income can be rewritten as:

$$(8) a(n) = (p(n) + V(n+1)) [i(n) / (1 + i(n))].$$

For values of  $i(n)$  greater than 0 (a money interest rate greater than 0%), a decrease in  $i(n)$  will decrease income. If consumption does not change, then saving decreases by a corresponding amount. However, the decrease in income was the result of an increase in depreciation and/or a decrease in appreciation, i.e., an increase in  $D$  equal to the decrease in income.

Free capital disposal,  $W = S + D$ , does not change. But  $R$  increasing and  $W$  unchanged, with initially  $R = W$ , implies planned investment exceeds free capital disposal. Thus, the economy exhibits a tendency toward an upward cumulative process.

The effect on monetary equilibrium of a change in the state of expectations is somewhat more difficult to determine precisely. If expectations of returns move unilaterally in an optimistic direction, capital values,  $V(n)$ , and gross real investment,  $R$ , will tend to increase. Incomes will also increase, as is evident from the equation:

$$(9) a(n) = V(n) i(n).$$

The change in free capital disposal,  $W$ , will depend, however, on both the intertemporal distribution of the movement in expectations and on any shift in the demand for consumption goods arising from the increased incomes. If the change to more optimistic expectations does not affect the (expected) returns in the current period and/or if the demand for consumption goods either remains the same or is

increased, then free capital disposal will either remain the same or have a tendency to decrease. Monetary equilibrium is ruptured again with the tendency toward an upward cumulative process.<sup>7</sup>

#### D. Myrdal: The Price level – The Commodity Market

The Wicksell-Davidson polemic on monetary theory and policy has been intensively analyzed by Uhr (1960, 270-305). Wicksell believed that constant (commodity) price level was a condition of monetary equilibrium and therefore price stabilization through interest rate adjustments should be a norm of monetary policy. Myrdal claims that Davidson believed that, *ceteris paribus*, if:

(The) technical productivity of the means of production increases ... the price level for finished goods must decrease correspondingly or else the whole monetary system falls out of equilibrium and a typical cumulative process upward is started (1962, 130).

Myrdal attempted to resolve this debate. He first observed that a perfectly uniform price movement in one direction or another would increase or decrease both sides of the equation  $R = W$  by the same proportion. Monetary equilibrium would not be disturbed. Wicksell's third condition of monetary equilibrium is not consistent with the second condition.

However, this critique still depended on the assumption of parallel price movements. Myrdal states:

The monetary equilibrium condition would thus in themselves be quite independent of the development of prices. They would not determine the absolute price movement, but would fully determine certain price relations (133).

In an economy with credit, wage and other time contracts, administered prices and other elements of price inertia, price movements will result in changes in the distribution of incomes, wealth and the level on income. The stickiness of some prices implies that price movements (for whatever reason) are likely to disrupt the price relations consistent with monetary equilibrium. "A monetary policy aimed to preserve the equilibrium relations must, therefore, adapt the flexible prices to the absolute level of the sticky ones" (134).

Capital values, because they depend on expectations of money interest rates and returns from capital, are flexible. Production costs of capital, because they contain

many sticky elements like wages and other factor prices, are sticky. But as we showed in Part C, capital values are highly responsive to changes in the current interest rate. Thus, the price index that is stabilized by monetary policy, consistent with monetary equilibrium, should be defined as an index

“... in which individual prices are weighted first, with respect to their stickiness of reaction, and second, with respect to their relative importance in the calculation of profitability by the entrepreneurs and consequently in the volume of real investment (136).

Myrdal goes on to emphasize, that as the above analysis indicates, stabilization of the general price level or commodity price level is not equivalent to business stabilization. Monetary equilibrium does not necessarily imply business stabilization. In an economy with imperfect competition, a monetary policy which attempts to maintain monetary equilibrium would not necessarily maintain full employment and/or full capacity utilization.

Carl G. Uhr, in his review of Myrdal’s contribution to the later development of Wicksell’s monetary doctrine, writes that monetary equilibrium would not only, not

“... guarantee full employment, but rather the very equilibrium it would be striving to maintain must be predicated on a volume of underemployment of resources corresponding to the degree of imperfect competition prevailing in its product and factor markets (323).

Furthermore:

This clearly brought into view the possibility of underemployment equilibrium resting on market structure and on institutional premises, rather than on the narrower basis of infinitely elastic liquidity preferences at low interest rates and of an implied or explicit prognostication of secular stagnation to account for the failure of investment *ex ante* to revive sufficiently. These premises are characteristic of the related Keynesian analysis (323).

The control of unemployment and the business cycle must be based on policies other than monetary policy.<sup>8</sup>

#### IV. Contemporary Monetary Models

The contemporary models which approach Myrdal's model the most closely are the monetary growth models. In his review of monetary growth theory, Jerome Stein writes:

Monetary growth theory is concerned with the role of money in a growing economy. Money is a medium of exchange and store of value which may or may not be costless to produce, and which is a liability of either the government or a private banking system. Monetary policy is concerned with the management of these types of money. ... It is obvious that the growth of a commodity money (e.g., gold) will affect the real variables in the system, because resources (labor, capital) are required for the production of gold. Can variations in the rate of growth of a type of money which is costless to produce affect the time profiles, and steady state solutions, of these real variables? Is there an optimum growth of the various types of money? What are the most desirable stabilization policies in a growing economy? (1970, 85).

The monetary growth models can be divided in two types—the neoclassical models and the Keynes-Wicksell (Keynesian-Wicksell) models. The neoclassical models assume that markets are always in equilibrium regardless of the rate and distribution of price changes and that the rate of capital formation is identically equal to planned savings. The Keynes-Wicksell models assume that prices are changing if, and only if, there is market disequilibrium and that there are independent savings and investment functions. Both types of models portray one sector economies in that, besides money, there exists only one good.

From this brief description, it is already possible to point out substantial differences between monetary growth theory and Myrdal's monetary theory. Perhaps the most obvious difference is that monetary growth theories emphasize the "quantity of money", while most of Myrdal's analysis proceeded on the assumption of a "pure credit" economy.

It is well known that the meaning of the expression, "the quantity of money", is subject to much controversy. Furthermore, except in the case of a "pure cash" economy, the velocity of circulation of money has a variable magnitude. Therefore, the "quantity of money" is almost impossible to measure. One of the important facets of Wicksell's monetary theory, was the assumption of a "pure credit" system, and thus escape "from the tyranny which the concept 'quantity of money' has ... exercised on monetary theory."

The role of money in neoclassical models depends on the manner in which money is introduced into the model. Money can be inside money and/or outside money; real balances can be a variable of the consumption function and/or a variable of the production function; growth in the money supply can be accomplished by transfers from the public sector to the private sector and/or by the payment of interest on money.

The assumptions selected will determine if money is neutral, i.e., if an increase in the rate of monetary expansion affects the steady-state capital intensity and other “real” variables. In the Keynes-Wicksell models with a dynamically stable economic system, an increase in the rate of monetary expansion can have an indeterminate effect on the steady-state capital intensity.

The assumption of a one sector economy is also antithetical to Myrdal’s approach. Myrdal was interested in modelling an economy where techniques, tastes and resources could change, and thus relative prices could change overtime. This is clearly impossible if one good represents all consumption and capital goods and therefore the price of the capital good is equivalent to the price of the consumption good.

The assumption also implies that spot markets exist for all capital goods. In Myrdal’s theory, capital values were subjectively determined by discounting expectations of prices, quantities and interest rates. Consequently, expectations have a more limited role in monetary growth theories. Only price expectations are required. Because spot markets exist for all goods, mechanistic expectation formation (e.g. adaptive expectations) appears reasonable in that the spot prices have more objective control over expectations.

It is also of interest to compare the dynamics of price movements. In the Keynes-Wicksell models, price movements are related to an excess demand for goods or an excess supply of goods. In the neoclassical models, price movements are derived as a necessary condition of maintaining portfolio balance in the steady-state equilibrium. While the Keynes-Wicksell approach is clearly preferable to the neoclassical invocation of a *deus ex machina*, both approaches fall short of Myrdal’s incorporation into his model of the effect different market structures have on price movements.

The non-existence of spot markets for many second-hand physical capital goods, the consequent increased subjective element in expectation formation and the investment decision based on a paucity of information, and their relationship with

monopolistic market structures is a phenomenon which, in my opinion, is inadequately described by current economic theory.

The Keynes-Wicksell approach also appears more realistic than the neoclassical approach in that saving and investment are recognized as distinct entities in Keynes-Wicksell models. This distinction was fundamental to Myrdal's approach. We recall that the condition for the existence of monetary equilibrium was that that planned investment equal free capital disposal (planned saving in a one sector model). The neoclassical models, by definition, always obtain monetary equilibrium as defined by Myrdal. Planned investment, in both the Keynes-Wicksell and Myrdal models, is a function of the difference between the expected yield on capital and the nominal (monthly) rate of interest.

In the Keynes-Wicksell models, however, the expected yield equals the sum of the real rental rate per unit of capital plus the expected inflation rate on consumption goods. The distinction between real and nominal variables in monetary in monetary growth models in general contrasts with Myrdal's analysis which proceeded entirely in nominal terms. Myrdal deprecated, as normative, any attempt to extract real variables pertaining to a barter economy from a dynamic monetary economy.

In conclusion, it can be said that Myrdal anticipated much of what passes as modern monetary theory.<sup>9,10</sup> The greatest defect in his analysis, in my opinion, was the virtual exclusion of any consideration of financial markets and institutions. However, the assumption of a pure credit economy allowed Myrdal to break the grip, already loosened by Wicksell, that the quantity theory of money had on monetary theory.

#### Footnotes

1. See Karl-Gustav Landgren, Economics in Modern Sweden, and Donald Winch, "The Keynesian Revolution in Sweden" for expositions on Swedish economic policy during the depression years.
2. Carl G. Uhr, Economic Doctrines of Knut Wicksell, (315), questions the necessity of Myrdal's transformation of the "natural rate" into the marginal value productivity of real capital. Wicksell had already done this in Lectures II, Lectures on Political Economy.

3. We are assuming that payments (expenditures) for the  $n^{\text{th}}$  period are received (disbursed) at the end of the period. Therefore, the payments (expenditures) must be discounted by the money interest rate prevailing (or expected to prevail) during the  $n^{\text{th}}$  period to determine their value at the start of the period.
4. We have compared the expected yield on capital with the expected yield on money instead of the money interest rate because we have assumed that all monetary transactions occur at the end of each period (See Footnote 3).
5. See Tord Palander “On the Concepts and Methods of the Stockholm School” for a criticism of Myrdal’s dynamic approach.
6. This point is made by Erik Lundberg in Studies in the Theory of Economic Expansion which contains many “model sequences of economic expansion.”
7. Our presentation has ignored Myrdal’s emphasis on the interrelationship between his theoretical variables and cognate variables. In our opinion this omission is justified on the grounds that Myrdal’s theoretical framework is of sufficient interest to warrant separate development. The inclusion of ex post variables would both complicate and lengthen our exposition.
8. In Chapter VIII of Monetary Equilibrium, Myrdal examines various “norms” of monetary policy. He comes to the conclusion that based on the value premise that ‘too large and unidirectional price movements should be eliminated as far as possible,’ the correct norm of monetary policy was to “achieve the most complete fulfilment possible of the equation  $R = W$ , compatible with the least possible movement of a price index weighted with regard to the stickiness of various prices and their significance for profitability of real investment.”
9. For a comparison of Keynes’ General Theory and Myrdal’s Monetary Equilibrium see G.L.S. Shackle, The Years of High Theory (94-128).
10. Although we have not compared Myrdal’s monetary theory with the less dynamic modern monetary theories, we note that the stimulus to investment resulting from an excess of the subjective value of capital over the cost of production of capital is fundamental to Tobin’s portfolio theory.



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