On Prices in Myrdal's Monetary Theory

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***Abstract*:** The aim of this paper is to show how Myrdal's monetary theory can contribute to the study of the behaviour of prices in disequilibrium. The analysis explains the existence of a cumulative process based on the capacity of the entrepreneur to anticipate price variations. The variation in prices explains the persistence of the cumulative process. This, we argue, represents an opposite view to the one contained in Wicksell's theory. Myrdal's theory leads to the rejection of the quantity theory of money based on Wicksell's approach. This comes as a surprising result, given that Wicksell believed his results confirmed this theory.

1 Introduction

Gunnar Myrdal belongs to the group of economists that presents a relationship between money and prices in the Wicksellian approach. He is considered as the author who introduced the *ex ante/ex post* distinction into economic theory, which is the starting point for Hicks's (1939) temporal equilibrium theory. Even though references to Myrdal's work, *Monetary Equilibrium* (1939), abound in economic theory, an in-depth study of his analysis is still lacking.[1] His main contribution continues to be ignored: the improvement of knowledge concerning the variation of prices in a situation of monetary disequilibrium.

The little recognition received by Myrdal's theory and by most of the Swedish literature is due to the consolidation of the neoclassical-Keynesian synthesis. The consensus around the interpretation given in the *General Theory* erased any possibility of considering alternatives derived from previous theories. The IS-LM framework, in the version found in the rational expectations model, has never tried to establish any explicit relationship with the Swedish tradition, in which expectations have also a fundamental role. In modern macrodynamic theory, efforts focus on the construction of an equilibrium model with microeconomic foundations. In this model, money prices have a secondary place, contrary to Myrdal's model. Modern macroeconomics is every day further apart from its original intuitions. This is why, we believe, Myrdal's theory is not anachronistic.

Myrdal's analysis is built as a criticism of the definition of monetary equilibrium in Wicksell's approach (1898).[2] In his doctoral dissertation in 1927, entitled *The Problem of Price Formation and Economic Change*, Myrdal had already focussed on the classical problem of the determination of equilibrium prices. He used a microeconomic approach and he introduced the ideas of risk and expected profit. Following this tradition, the research programme established in *Monetary Equilibrium* is also built on the question of prices. In a macroeconomic approach, the analysis of prices appears explicitly in what Myrdal called 'The Third Condition of Monetary Equilibrium'. According to this condition, he proposes a theory of prices in equilibrium and disequilibrium that constitutes at the same time a criticism and a solution for the problems raised by Wicksell's theory.

Despite its importance, Myrdal's analysis of prices is obscure and strikingly disconnected from the rest of his theory. These two difficulties have not

been overcome by later commentators. They study the other conditions of monetary equilibrium: first, concerning the equality between the monetary interest rate and the natural interest rate; and, second, concerning the equality between investment and savings. The most important works are Palander (1941), Shackle (1945) and chapter 10 of Shackle (1967), which are exclusively dedicated to the study of *Monetary Equilibrium*. These studies underline expectations as the way to introduce a dynamic approach into Wicksell's theory, especially in defending a policy of price level stabilisation. Palander (1941) is the only detailed study of the third condition. Nevertheless, his analysis has sense only within Lindahl's theory.[3]

The aim of this article is to show the specificities of Myrdal's analysis of prices in relation to Wicksell's analysis. In particular, we improve the concept of monetary equilibrium and we present Myrdal's model as a solution to the most important problem in Wicksell's theory: the stopping of the cumulative process of prices. The specificity of Myrdal's theory is derived from the entrepreneur's capacity to anticipate the non-proportional variation in prices. In this case, the entrepreneurs can obtain an additional profit in real terms. This result concerning the non-proportionality in the price variation of prices can also be obtained with the stickiness of some prices. Myrdal's analysis leads to the rejection of the quantity theory of money based on Wicksell's approach. This comes as a surprising result, since Wicksell believed that his results confirmed this theory.

In order to reach this objective, we have to identify the monetary equilibrium, in both Wicksell's and Myrdal's works. Then we present the disequilibrium analysis or the cumulative process of the general price level using the *ex ante/ex post* distinction. Finally, we show the advantages of Myrdal's model *vis-à-vis* Wicksell's theory.

2 Definition of the Monetary Equilibrium

In order to define monetary equilibrium, we must begin by showing the difference between Wicksell's definition and the one Myrdal proposes based on his criticism of Wicksell. It is well known that Wicksell's monetary equilibrium is defined by three fundamental conditions: 1) the equality between the money interest rate i_m and the natural interest rate i_n; 2) the equality between investment I and savings S; and 3) the stability of the general level of prices, that is to say, its variation rate in time, $\hat{P}$, is equal to zero. We have then:

$$i_m = i_n$$

$$I = S$$

$$\hat{P} = 0$$

The money interest rate is defined as the rate at which entrepreneurs[4] borrow money from banks, and the natural interest rate is defined by the physical marginal productivity of production factors in the roundabout process of production. If the two interest rates are equal, the entrepreneur is not induced to modify his output level because he does not perceive any possibility of obtaining an additional profit. This situation is reflected at the macro level because investment is equal to savings, or what comes to the same thing as Keynes pointed out, the aggregate supply of goods is equal to the aggregate demand for goods.[5] Given this equilibrium situation, the general level of prices must remain constant. Thus relative prices will also remain constant. The persistence of this equilibrium over time implies that the inflation rate

is equal to zero. Clearly, the conditions are not independent of one another. Thus we have the three necessary conditions for a neutral monetary equilibrium.

Myrdal considers that 'Wicksell's conception of monetary equilibrium is far from clear and partly false' (Myrdal 1939, p. 30). His aim is not to reject the concept of a monetary equilibrium but to replace 'this notion of a monetary equilibrium by a clear and theoretically better concept' (*ibid*., p. 30). Following Hicks, the three components of Myrdal's criticism can be summarised as follows: 'Professor Myrdal [...] finds, as others have found, that (1) and (2) are consistent, but that the fulfilment of conditions (1) and (2) does not necessary imply the simultaneous fulfilment of (3)' (Hicks 1982, p. 43). We will see that the immanent criticism is more complex.

In Myrdal's theory, if there is full employment and flexibility of prices, the monetary equilibrium is defined by three conditions:

> 1) The value of the new capital goods (new investment) c_2 is equal to the cost of production of these new capital goods r_2. This condition means that, for the entrepreneur, the demand price of capital goods (or new investment) is equal to the cost of production of these goods.[6] In this situation, the entrepreneur receives a normal profit (or equilibrium profit), because no additional profit is possible. Shackle specifies that, if c_2 is equal to r_2, 'this equality is the condition for *ceteris paribus* constancy, not of the general price level but of the size of the aggregate net investment flow' (Shackle 1967, p. 114). Therefore, the entrepreneur perceives no possibility of obtaining an additional profit. This first condition is only valid for new goods and it cannot be extended to all goods as in Wicksell's theory.
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> 2) Gross real investment R_2 is equal to the free capital disposal W. This condition has two parts. First, the gross real investment R_2 contains reinvestment as well as new investment. Second, the free capital disposal W contains net saving S plus a monetary magnitude called factor D. Thus we have $W = S + D$. Net saving is defined as the difference between net aggregate income and consumption, that is, $S = E - C$. Factor D measures the gap between depreciation and appreciation values. Furthermore, it represents Myrdal's theoretical novelty concerning the connection between money prices and expectations. All this deserves a more detailed explanation.
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> Factor D is defined as the term which measures expectations. It corresponds to expected net change in capital value. According to Myrdal, this factor is:
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> > calculated for the period by taking into consideration all expectations of income and cost for the *whole* remaining life of the capital goods and also the interest rates which actually rule in the existing situation and are expected to rule in the future. The anticipated value-change is here given a positive sign for the ordinary case when the change is a depreciation in value, which means that an appreciation is reckoned as a negative depreciation. It is then defined as the difference between the present value of the real capital and the expected capital value at the end of the unit period. This net change of the value has also to be discounted to the present. (Myrdal 1939, p. 58)
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> Hence, if this difference is negative, factor D represents an additional profit and, if this difference is positive, factor D represents a loss.

Once the distinction is made between factor *D* and savings, we can understand why capital is 'free'. Myrdal explains: 'This capital disposal, *W*, is "free" 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 the invested property value as corresponds to the amount of depreciation minus appreciation' (*ibid*., p. 97). Thus the second condition implies that the economy has an amount of resources *W*, represented by the gross real investment R_2.

3) In the definition Myrdal gives of an equilibrium, if conditions 1) and 2) are fulfilled, every proportional variation of the general price level leaves the two previous conditions unchanged in real terms. Therefore, the variation rate of the general level of prices over in time, $\hat{P}$, is equal to a constant *k*. This constant is positive if prices rise and negative otherwise. In fact, in an equilibrium situation, if the quantity of money rises proportionally in each period, the general price level varies proportionally. This proportionality implies that relative prices are unchanged. Thus the inflation rate is constant in time and is not zero as in Wicksell's model. Wicksell 'accepted the comfortable formula of a constant price level more by sentiment and as a result of a normative, *a priori*, intuition' (*ibid*., p. 128). To summarise, we have the three conditions for a neutral monetary equilibrium in Myrdal's approach[7]:

$$c_2 = r_2$$

$$R_2 = W$$

$$\hat{P} = k$$

The interaction between factor *D* and the third condition of the monetary equilibrium (prices condition) allows us to establish the specificity of Myrdal's theory in a Wicksellian approach. This is clearer when Myrdal explicitly introduces the *ex ante/ex post* [8] distinction. As is well known, in one period there exist three moments: an *ex ante* moment for the construction of investment plans based on expectations; the period during which the plans are accomplished; and the *ex post* moment during which results of plans are recorded. Following Myrdal, the definition of the monetary equilibrium is interesting in a Wicksellian approach if the three conditions are established at the *ex ante* moment. This *ex ante* equilibrium is possible if plans for purchases and sales are compatible. This means that each entrepreneur anticipates the same prices for the same goods, that is to say, the anticipated prices are equilibrium prices.[9] We can understand the previous proposition because, in a state of equilibrium, the inflation rate is constant.

Considering this compatibility between the expectations of different entrepreneurs, the first condition is fulfilled at the *ex ante* moment, because no entrepreneur can anticipate any additional profit. The second condition is fulfilled because *ex ante* investment is equal to *ex ante* free capital disposal, and the third condition is also fulfilled because all anticipated prices vary in the same proportion. The inflation rate remains constant and the monetary equilibrium remains unchanged in real terms. Once the monetary equilibrium is defined, efforts should

be addressed towards an understanding of the disequilibrium situation. According to Myrdal, starting from a monetary equilibrium situation which is defined by his three conditions, an *ex ante* monetary disequilibrium can result from changes in expectations about prices or from changes in the money interest rate. In Wicksell's theory, a disequilibrium situation is clearly defined by the cumulative process of prices.

3 Verification of the Monetary Disequilibrium

Let us begin with a monetary equilibrium, where $c_2 = r_2$, $R_2 = W$ and $\hat{P} = k$. Given this equilibrium, banks decide to lower the money interest rate i_m. What is the effect upon the monetary equilibrium? The entrepreneur's investment decision is taken on the basis of the net discounted income *e′*, which is calculated using the *ex ante* money interest rate and a system of anticipated prices. These two variables allow us to compute the discounted gross earning *b′*, the discounted costs *m′*, and factor *d′*, a net monetary value from depreciation/appreciation. Thus we have the following equation at the individual level: $e' = b' - m' - d'$.

If the money interest rate decreases at the beginning of the period, the *ex ante* net income should rise because of actualisation,[10] but also because of the entrepreneurs' anticipation of an increase in the general level of prices which does not correspond to the inflation rate of the previous period. Prices will increase because demand is greater than supply. The compatibility of plans is destroyed because each entrepreneur anticipates, independently, a different increase in money prices. Entrepreneurs expect an additional profit because factor *d′* decreases, which produces a reduction in the cost of depreciation and/or an increase of income by appreciation.[11] The increase of prices affects factor *d′* since it depends on the anticipated prices. Myrdal asserts: 'depreciation and appreciation are by no means determined by the ruling prices of the present situation but by anticipated future prices' (Myrdal 1939, p. 99).

The increase in net income leads to an increase in capital value, which is superior to its cost of production.[12] Thus $c_2 > r_2$; Myrdal calls it an 'optimistic state'. The first condition is not respected at the *ex ante* moment, so that a disequilibrium is verified at the individual level. Anticipations about price variations are linked to the existence of an additional profit through factor *d′*. According to Myrdal, 'the anticipations can become significant for the profit margin only in connexion with changes in capital values' (*ibid*., p. 132).

Given the incompatibility of individual plans, which appears through the gap between c_2 and r_2, an aggregated disequilibrium is also verified. Entrepreneurs increase their demand for credits, and consequently the investment R_2 increases *ex ante*. But what happens to *ex ante* free capital disposal *W*? Myrdal considers free capital disposal to be a very important variable, since it allows us to determine aggregate disequilibrium in a more specific way. However, Myrdal is not entirely straightforward because he does not insist on the relationship between saving and money interest rate. We define free capital disposal through the equation $W = S + D$. In order to determine what happens with *W*, we have to see what happens with *S* and *D*.

(a) Factor *D*. We define the *ex ante* net income for each entrepreneur using the equation $e' = b' - m' - d'$. Therefore, at the aggregate level, the *ex ante* aggregate net income *E* is defined by the equation $E = B - M - D$. If factor *d′* decreases for

each entrepreneur, the aggregate factor *D* also decreases. Therefore, the *ex ante* net aggregate income increases.

(b) Saving. Net saving is determined by net aggregate income *E* and the money interest rate i_m. If the money interest rate diminishes, the net aggregate income increases. This rise allows an increase in saving. Thus the rise in net aggregate income has a positive effect on saving. But, if the fall in the money interest rate is steep, saving might decrease. The money interest rate has a negative effect on saving. Consequently the variation in saving is indeterminate. Let us suppose a situation where the money interest rate and saving is given by the point (i_m^*, S^*) in Figure 1. Saving is determined for a given level of *ex ante* net aggregate income. If the money interest rate falls to i_m', the net aggregate income increases because of the reduction in factor *D*. Thus the increase in the net aggregate income causes a displacement towards the right of the saving curve. Saving increases to *S′*. However, if the money interest rate falls sharply, for example to i_m'', saving decreases, reaching *S″*. Given this last possibility, we cannot expect that a significant increase in saving will be able to compensate the reduction in factor *D*. In this case, *W* probably is not constant and can decrease.[13]

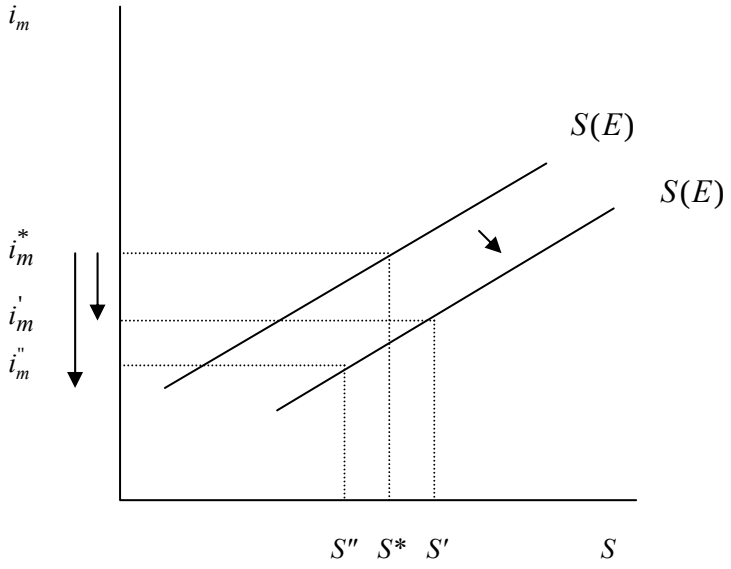

Figure 1: Interest and Saving

In brief, we have a strong argument suggesting that $R_2 > W$. In this case, the second condition of a monetary equilibrium is not respected. The goods market is in an *ex ante* aggregate disequilibrium because aggregate demand is greater than aggregate supply. If money is pure credit, the loans market is always in equilibrium because banks satisfy all the demands for credit.[14]

We will analyse the consequences of a decrease in the money interest rate on the third condition of the monetary equilibrium, or the condition for the general price level.

4 Variation of the General Price Level

Once individual and aggregate disequilibrium is verified at the *ex ante* moment, a cumulative process takes place. Initially, aggregate demand is greater than aggregate supply at the *ex ante* moment, so that all prices increase during the period. There are two questions to answer. First, we have to know whether this rise in prices is a proportional or a non-proportional variation. Second, we must determine whether this increase in prices (proportional or not) corresponds to the variations expected by each entrepreneur at the *ex ante* moment.

In order to answer these questions, it is necessary to rebuild the main argument. In the *ex ante* disequilibrium, entrepreneurs make investment plans, which *a priori* are not compatible. Once those entrepreneurs are in the market during the period, they confront their purchase and sale plans. Market prices are formed and transactions are made. The aggregate disequilibrium is verified since aggregate demand is greater than aggregate supply, and all prices rise. At the *ex post* moment, entrepreneurs realise that prices are higher than they expected them to be when the money interest rate decreased. But what is the relationship between the *ex post* market prices and the *ex ante* prices?

The relationship between market prices and expected prices is established using two cases: i) a proportional increase in prices which is not anticipated by the entrepreneurs; and ii) a non-proportional increase in prices which is not perfectly anticipated. In case i), if all prices increase proportionally, entrepreneurs do not obtain any additional real profit. Therefore, entrepreneurs do not have any reason to demand more credit, so the cumulative process stops. Entrepreneurs should examine their expectations for the following period.

Case ii) implies that some entrepreneurs obtain a positive real additional profit, others receive the normal profit (or a null real additional profit), and others lose. During the following periods, all entrepreneurs examine their expectations independently of the profit received. Entrepreneurs with positive real profits will continue to demand credit. Prices will continue to increase, justifying the persistence of the cumulative process. In this case, there is a disequilibrium between R_2 and W, as examined in section 3. This profit is realised through the forced saving phenomenon. This phenomenon is linked to nominal income, which varies non-proportionally in relation to money prices. These incomes are fixed by contracts which are actualised frequently. Profits are excluded, since the profit function is homogeneous of degree one.

Entrepreneurs experiencing losses will continue to demand credit because they must repay credits they acquired in preceding periods. These entrepreneurs enter the productive system again and they wish to maintain the same level of production – a level that allows a normal profit. Thus all prices increase, justifying the persistence of the cumulative process. In this case, we also find a disequilibrium between R_2 and W.

It is necessary to determine exactly the variation in prices. It is clear that if all entrepreneurs receive positive real profits, new production is engaged. Prices will continue to increase. But, if all entrepreneurs have losses, the demand for credit will rise; however, this additional amount of money only allows the financing

of the same level of production. Prices are constants. In this last case, even if only one entrepreneur has positive real profits, prices increase. The disequilibrium between R_2 and W will persist until banks set the money rate interest at the equilibrium level. There is no re-equilibration process.

Let us now try to determine which one of the two cases is compatible with Myrdal's model. First, Myrdal underlines that 'every business man knows that no such thing as a homogeneous price level exists. He knows, rather, the significance of the changes of the price relations *within* the price level' (Myrdal 1939, p. 18). This means that entrepreneurs are interested in price variations which are favourable, that is to say, when the increase in the price of the output is greater than the increase in costs. This situation is possible only if each entrepreneur anticipates a non-proportional variation of prices. This is the only way to justify the link between the entrepreneurs' expectations and their decisions on the market. The idea is clear for Myrdal, since 'decisions to buy and sell a commodity are made by quite different individuals' (*ibid*., p. 23). Therefore, case i) is rejected. In brief, the non-proportional variation of prices implies a modification in relative prices.

Secondly, we know that in Wicksell's theory a monetary equilibrium implies that prices remain unchanged and monetary disequilibrium implies a variation in prices, that is to say, a cumulative process. In Myrdal's model, prices change in equilibrium as well as in disequilibrium. Thus the definition of these two situations depends on the kind of variation. For Myrdal, the monetary equilibrium is defined by the absence of a cumulative process. This definition holds only if we accept a proportional variation in prices in equilibrium and a non-proportional variation of prices in disequilibrium. More exactly, equilibrium is defined by the absence of the cumulative process where price variations are non-proportional. Hence Myrdal's monetary equilibrium has a meaning if we accept case ii).

The non-proportionality proposition holds if we introduce a hypothesis concerning sticky prices. Myrdal asserts: 'Because of the stickiness of some prices, every primary change of some importance in the price system will disturb the parallelism within the complex of price relations […]. The sticky prices would act as a restraint on the price system' (*ibid*., p. 134). If some prices are sticky and others are flexible, the structure of relative prices is modified. This implies that some entrepreneurs obtain a positive real additional profit, others receive the normal profit, and others lose. This positive real additional profit is also realised through the forced saving phenomenon.

An interesting consequence of Myrdal's hypothesis concerning price stickiness can be derived by looking at the difference between the market for goods and the market for labour. If prices for goods are flexible and the price of labour – the nominal wage – is sticky, we obtain the distinction made in Keynes's *General Theory*. This result suggests that Myrdal and the Swedish economists anticipated certain intuitions contained in the *General Theory*. This idea is defended by Ohlin (1937, 1978) and Shackle (1967) and is attacked by Patinkin (1978, 1982). We can add that Myrdal also anticipated certain intuitions found in the works of some New Keynesian macroeconomists, because nominal and real stickiness are derived from microeconomic behaviour.

To summarise, through case ii) Myrdal attacks the quantity theory of money. Since the quantity of money increases, the general level of prices also increases in a non-proportional way. The structure of relative prices is modified, showing the non-neutrality of money. This is an important contribution made by Myrdal to monetary theory. This analysis of prices is contrary to Palander (1941),

who considers that the analysis of Lindahl's sequences is necessary to demonstrate an adjustment process in Myrdal's theory. This process implies an adjustment through quantities when prices are fixed arbitrarily by the entrepreneurs. In the following section, we show that even if Myrdal's theory leads to the rejection of the quantity theory of money in the Wicksellian approach, he proposes a solution to the problem of the cumulative process in Wicksell's theory.

5 Myrdal, Wicksell and the Problem of Expected Prices

Wicksell's contribution to the quantity theory of money is a cumulative process which explains an indirect link between money and the money rate of interest that shows the neutrality of money. If the monetary equilibrium – which is defined by the three conditions analysed in section 2 – is disrupted, a cumulative process of prices is launched. If banks lower the money interest rate i_m, this rate is lower than the natural rate i_n. In this case, entrepreneurs anticipate a real additional profit, based on the idea that current prices are stable. They will increase their demand for credit. Thus investment I is greater than savings S; that is to say, the aggregate demand of production factors is greater than their aggregate supply. There exists a disequilibrium in the goods market since entrepreneurs cannot purchase the factors of production.

If banks are not subject to any restriction, they will satisfy all demand for credit, so that the credit market is always in equilibrium. In a full employment situation, given the disequilibrium in the goods market, all prices should increase. In this way, entrepreneurs will see all prices increase proportionally, and therefore they will receive a higher nominal profit but no real additional profit. In the following period, with stable current prices, entrepreneurs will continue to demand more credit. The disequilibrium in the goods market persists, and prices will continue to increase. There will be no changes, either in relative prices (because all prices increase proportionally), or in the real wage, or in the employment level. Thus, the neutrality of money is verified. The price level is unstable until banks decide to fix the money rate of interest at the equilibrium level. The price level is determined by banks.

The existence of the cumulative process supposes that entrepreneurs demand more credit; even if they do not receive any real additional profit. This is an unacceptable proposition. If, at the beginning of the period, entrepreneurs receive a zero real additional profit, they have no reason to demand more credit in the following period. At this point, the cumulative process stops. The price level is determined before banks decide to increase the money rate of interest to its equilibrium level. This is not the case in Myrdal's model because his cumulative process cannot be stopped. Once entrepreneurs anticipate a non-proportional variation in prices, some can receive a positive additional profit in real terms. This is the consequence of accepting case ii).

We know that the same result can be obtained using the price stickiness hypothesis: if there are some sticky prices and other prices are flexible, the structure of relative prices is modified. This implies that some entrepreneurs obtain a positive real additional profit and, as a result, the cumulative process continues. However, if the degree of price stickiness and relative weight of each individual market were taken into account by banks setting the money rate of interest, the cumulative process would stop, as in Wicksell's approach.

To summarise, Myrdal's model appears as a solution to the end of Wicksell's cumulative process. At the same time, if money prices vary non-proportionally, the structure of relative prices is modified. The neutrality of money cannot be verified. Myrdal obtains a very interesting result: he rejects the quantity theory of money using Wicksell's approach although the latter believed his theory confirmed it. Wicksell 'established close contact with the traditions of the old quantity theory, which [he] never intended to displace but only to improve' (*ibid*., p. 129).

Myrdal is convinced that his theory rejects the postulates of the quantity theory using a Wicksellian approach. Nevertheless, as is well known, many economists (notably Schumpeter 1954) consider that Wicksell is not a quantity theorist. On the contrary, Marget (1938) quotes many passages where he claims to show Wicksell's affiliation to the quantity theory. Robinson's position is less clear. She believes that 'Wicksell deposed the Quantity Theory, while believing himself to adhere to it' (Robinson 1939, p. 494). Independently of Wicksell's affiliations, Myrdal's message is that anticipations about price variations are a way of destroying the neutrality of money imposed by the quantity theory.[15]

6 Concluding Remarks

We have established the specificity of Myrdal's monetary theory *vis-à-vis* Wicksell's theory. According to Myrdal scholars, this specificity is derived from the analysis of expectations, which gives rise to dynamic studies. Nevertheless, we have demonstrated that the true specificity is derived from 'the third condition of a monetary equilibrium', or the price variations condition. Through this condition, Myrdal presents his theory of price variations as a criticism of Wicksell's price level concept. We rebuilt Myrdal's third condition to make it clearer and more coherent with the other two conditions of an equilibrium.

Wicksell's monetary equilibrium is defined by three conditions which guarantee the neutrality of money. If the quantity of money increases, all prices increase proportionally, leaving the structure of relative prices unchanged. For Myrdal, this result cannot be obtained because entrepreneurs anticipate the price variation. In his model, if the quantity of money increases, all prices increase in different proportions. Given this non-proportionality, the structure of relative prices is modified. The cumulative process of prices is not a neutral adjustment, and the most important corollary of the quantity theory is rejected. Thus the old neoclassical definition of money is also rejected.

The origin of this result is the *ex ante/ex post* distinction. At the *ex ante* moment, a monetary equilibrium is verified if there exists a global compatibility among the plans of entrepreneurs, in such a way that conditions 1) and 2), from Myrdal's model, are fulfilled. Every proportional variation of prices (condition 3) leaves the previous two conditions unchanged in real terms. This compatibility implies a very special assumption: the *a priori* existence of an equilibrium price system. But, the most interesting point of Myrdal's theory is precisely that this compatibility is destroyed, which means that the economy is in a state of disequilibrium. The disequilibrium can be accepted as a favourable situation. This result is in sharp contrast to modern neoclassical theory, where only equilibrium is defined as an optimal situation.

In Myrdal's theory, the cumulative process can continue, since entrepreneurs who receive an additional profit or a normal profit demand more

credit. This is not possible in Wicksell's theory because, in his model, all prices increase proportionally, leaving no place for an additional profit in real terms. That means that the entrepreneur cannot anticipate the variation in prices. The cumulative process stops because entrepreneurs do not demand additional credits. Myrdal's model appears as the solution to prevent the end of Wicksell's cumulative process. Nevertheless, as we have said, this solution rejects the neutrality of money.

The rational reconstruction of the 'third condition of monetary equilibrium' in Myrdal's theory allows us to understand his most important contribution: knowledge concerning the variation of prices in a situation of monetary disequilibrium. His analysis shows that market prices are determined by the decisions of independent entrepreneurs, given their ignorance about future price variations. Thus Myrdal's theory shows the importance of prices in macroeconomics analysis.

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Notes

1 The original version of *Monetary Equilibrium* appears in Swedish and is entitled 'Om penningteoretisk jämvikt', *Ekonomisk Tidskrif* 1931, published in 1932. A German version is entitled 'Der Gleichgewichtsbegriff als Instrument der geldtheoretischen Analyse', published in *Beiträge zur Geldtheorie*, edited by Hayek, Vienna 1933. For more details about modifications in each version, see Palander (1941).

2 Lindahl criticises Wicksell's concept of monetary equilibrium in his work *Penningpolitikens Medel* (Methods of Monetary Policy), 1930, partly translated in Lindahl (1939), part II, entitled *The Rate of Interest and the Price Level*. Myrdal opposes Lindahl's criticism, particularly on the question of prices.

3 Some works exclusively dedicated to Myrdal's thought are: Hicks (1982), Dostaler (1990) and Dostaler *et al.* (1992). Most of Myrdal scholarship is found within the Stockholm School tradition, for example: Ohlin (1937, 1978), Lerner (1940), Patinkin (1978, 1982), Hansen (1981), Hansson (1982), Jonung (1991, 1993) and recently Laidler (1999).

4 To simplify our study, we assume that the entrepreneur is at the same time the owner of capital, so that he is an entrepreneur-capitalist.

5 Wicksell and Myrdal do not use the concepts of aggregate supply or aggregate demand.

6 It seems that the first condition was taken from Walras's capitalisation theory, which was introduced in Sweden by Gustav Cassel. Thus Myrdal's temporal equilibrium is closer to Walras's thought than to Marshall's.

7 We keep Myrdal's notation to allow a direct confrontation with his text. The subscript $_2$ refers to the value of new acquisitions and the subscript $_1$ refers to the value of real capital existing previously.

8 Myrdal's distinction is, according to Lindahl, a fundamental method in the analysis of prices. He writes: 'An analysis of price development […] has recently been greatly facilitated by the adoption of the distinction between calculations made *ex ante* and *ex post* […]. This method has been found to be fruitful and to provide a simple solution of a number of disputed points particularly in the explanation of general price

level movements, as determined (among other things) by the relation between saving and investment. We are indebted to Professor Myrdal for having originated the suggestion and indicated its consequences for the analysis of price movements' (Lindahl 1939, p. 63).

9 Following Hicks, 'the *ex ante* magnitudes will only be necessarily equal if plans are consistent' (Hicks 1939, p. 183). In the same direction, Palander writes: 'monetary equilibrium in general implies a certain degree of congruence between different economic subjects' expectation about the same things' (Palander 1941, p. 56).

10 Following Hicks, 'A fall in interest rates will raise income if it raises the present value of actually expected receipts more than it raises the present value of the standard stream' (Hicks 1939, p. 185).

11 Shackle (1945) demonstrates the link between Myrdal's idea of an exchange value productivity (used in the first condition) and the net factor d' (used in the second condition). Factor d' is equal to the variation of the value of new capital goods over time: $d' = -(dc_2 / dt)$. The negative sign means a decrease in factor d'.

12 Shackle explains the meaning of this inequality: '$[c_2 > r_2]$ is a belief or working assumption in an individual's mind as to the profit he can make, expressed as a capital value at a point of time, by laying out money on accessions to his capital equipment according to a certain time-schedule which appears, by balancing the advantage of earlier completion against the extra cost of accelerated construction, to be optimal' (Shackle 1945, p. 57).

13 The negative effect of the money interest rate on saving is reinforced when we consider the real rate of interest. This rate is defined by the difference between the money interest rate and the inflation rate. When entrepreneurs anticipate an increase in prices, the inflation rate changes. If the money interest rate declines, the rise in the inflation rate leads to a greater reduction in the real rate of interest. This aspect reinforces the idea that the money interest rate restrains the increase in saving.

14 In Myrdal's model, money is also pure credit. He writes: 'The whole central monetary analysis is developed under the assumption of a free currency (*freie Valuta*) which means, in this connection, primarily that the banking system can handle any kind of credit conditions; which itself requires that the banking system be able to satisfy all demands for credit' (Myrdal 1939, p. 109).

15 Myrdal explicitly admits the importance of anticipations in monetary analysis: 'It is, therefore, essentially the same principal objection which I have to bring forward against both Keynes and Hayek….Their theoretical stating of the problem does not take proper account of the element of change and the anticipations….This objection is quite decisive since….the whole monetary problem depends on the factor of anticipation' (Myrdal 1939, pp. 33-4).

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