Credit and Price Determination in a Developing Economy

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Abstract

This paper examines in the context of a developing agrarian economy aspects of the Post Keynesian theories of inflation caused by income distribution conflict and of endogenous money creation. It highlights the ability of large agricultural producers to set stocks at strategic levels to influence the price of agricultural goods (and hence the income distribution) and the ability of manufacturers to raise their profit margins. In both cases, access to credit is essential, thus forming the link to endogenous money theory. This gives monetary policy a critical role to play in a developing country’s pattern of income distribution.

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A generic view of inflation as the result of income claims adding up to more than the value of output at current price has been proposed and successively refined by a number of authors; see, for example, Eichner and Kregel (1975), Rowthorn (1977) and Scitovsky (1978). In these models the inflationary process depends on three sets of considerations: (1) the ability of a group to set a price claim, (2) parameters and variables that determine the level of claims, and (3) the frequency of revising the claims. The purpose of this paper is to make two points, respectively about (1) and (2) above. The first one is that the ability to influence income share through an inflationary process need not necessarily show up in the ability to set prices directly. In flexprice markets, even though the price is market-determined, the influence of the producer on income-share manifests itself through a proxy item, namely the ability to hold stocks. In developing economies flexprice agricultural markets have an important part in price and income determination, and in the domestic political economy. It seems necessary, therefore, to take account of strategic manipulation of stock by traders of primary commodities in these markets in order to extend the cited literature to the analysis of developing economies.

The second point, made about (2) above, is that changes in the mark-up fixed by capitalists when they set prices, or in the amount of stock held by agents in a flexprice market, are both governed *inter alia* by access to credit. Thus relative access to credit by conflicting groups is an important component of their ability to influence price and income outcomes. The view taken can be termed a monetary, though not a monetarist, view and in some measures illustrates the suggestions of De Vroey (1984). It is suggested that in a model of inflation and income share determination for a developing economy, these considerations can be superposed on more basic post-Keynesian monetary models such as those proposed by Cripps (1977) or Moore (1988a). These suggestions naturally have some implication for the endogeneity hypothesis of money supply, and the issues are discussed in a subsequent section.

The scope of the present paper, however, does not entirely overlap with that of the literature cited. First of all, it discusses the problem of price determination in the context of a developing agrarian economy and not that of a developed industrial economy. Secondly, the conflict modelled is between industrial capitalists and agricultural producers; the nominal wage rate of industrial workers is held as a parameter. Also the discussion is comparative static, and does not explicitly develop a model of inflation; but implications for the nature of the accompanying inflationary process is commented upon.

Sections 1 and 2 introduce selected features of the agricultural and industrial markets in a developing economy. These features are collected together into a single period model of price and income determination in Section 3, and the nature of the inflationary process is
commented upon. Section 4 considers the issues related to the nature of money supply raised by the model. Section 5 concludes the discussion.

1. Market for Agricultural Commodities in a Developing Economy

An important strategic variable for a large producer, trader or a producer-cum-trader in a primary market of a developing economy is the agent's ability to hold back a certain amount of stock of the commodity over the market period. Since current price and current income are determined by market clearance, stockholding acquires a strategic role. By reducing supply in the flow market, it can cause a \textit{ceteris paribus} rise in price. This price plays an important role in the determination of income share of agricultural proprietors in relation to industrial capitalists and wage earners. A higher agricultural price consumes a larger part of industrial wages as the food bill of labour, converting it into agricultural income, and leaves a smaller share of wages to provide demand for industrial output.

To aid stylised presentation it is useful to think of the agricultural product as 'food', with the property that its price elasticity of demand is less than unity.\(^1\) Since the price elasticity of demand is less than unity, it would appear that suppliers as a body can always gain by increased stock holding. The resultant tendency to hold indefinitely large amount of stocks, however, is constrained by the following consideration. Because of inelastic demand, stocks can not be depleted without spoiling the market, until a bad harvest year. This increases the average expected inventory cost per unit stock held during a run of expected good harvest years and substantially erodes the profitability of stock holding. Optimal aggregate stock of the farm sector is thus conditioned by the nature of current and expected harvests and the volume of existing stock. These considerations show that it is not possible to have an endogenous model of intertemporal behaviour of stock holding by the farm sector. We have therefore concentrated below on a single period model where the implications of increased stock holding are examined for the price determination process.

Increased stock reduces current cash flow, and thus small producers whose current consumption and on-farm expenses depend on current revenue, cannot afford to hold stocks. Even if expected gains are much higher than prevailing interest rates, small farmers can not

\(^1\) The elasticity condition is empirically established for foodgrains markets in many developing countries; see, for example, Radhakrishna (1978). The condition also guarantees the stability of equilibrium of the model described below.
manipulate stocks simply because they have no access to the credit market. Thus stock holding is confined to large producers, who have either their own funds or access to formal and informal credit. These latter producers may also buy part of poor farmers' output in periods of expected poor harvests or rising prices, and hold it as stock. Given expectations about future harvests and the current level of stocks, the optimal level of addition to stock depends on the interest rate at which credit is available. However the optimal level is sometimes infeasible, because of the non-availability of credit. The actual amount of stock holding by the farm sector is thus related not only to the interest rate, but also to the tightness of the current credit situation. Formal sector credit available to the farm sector is generally disjoint from the credit available to the industrial sector as a matter of official policy. Thus a low interest rate may persist with excess demand for credit in the farm sector. In this situation informal sector credit would be available at a much higher than the formal sector rate, and may sometimes, but not necessarily, render stock holding unprofitable at current parameter values.

We can collect together these considerations into a more formal description of the food market. Since we will discuss a model of single period equilibrium and examine its comparative statics, we need not discuss how the optimal stock is determined. It is sufficient to acknowledge that there is a level of optimal stock holding, denoted \( S^* \), in any period, given the rate of interest and other parameters. Since stockholding reduces intra-period cashflow, the optimal stock \( S^* \) may not always be feasible, and the actual stock holding may be a credit constrained outcome. Actual stock holding from current output is written as \( \text{Min}\{S^*, C_a/c_a\} \), where \( C_a \) is the credit that the agricultural sector can muster, and \( c_a \) is a coefficient denoting the amount of credit needed to carry one unit of stock through the period.4

\[
(1) \quad S_a = \text{Min}\{S^*, C_a/c_a\}
\]

If \( A \) is the current output of this sector, net of its own consumption requirement, and \( S_a \) is addition to stock from current output, then current flow supply, or 'marketed surplus' is given by \( A - S_a \). While \( A \) is usually assumed to be stochastically distributed about a trend, \( S_a \) is the strategic part of the supply decision and influences the market clearing price. We assume that

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2 Access to the formal credit market is denied because of want of appropriate collateral. Informal sector lenders who know the grass root conditions well, would rather themselves buy the produce from the poor farmer at slightly higher than the market price, rather than allow the small farmer to gain by stock holding.

3 Generally this operates through sectoral credit allocation norms imposed on commercial banks by the central bank.

4 \( C_a \) should be interpreted as credit available over and above that necessary for production and investment activity in agriculture.
'food' is consumed solely by industrial workers. Capitalists' consumption of 'food', a small percentage of their total consumption and also of total marketed supply of 'food', is ignored for simplicity. The market equilibrium condition is then written as:

\[ A - S_a = D(p_a, W) \]

(2) \[ A - S_a = D(p_a, W) \]

\[ D_1 < 0, D_2 > 0, -D_1(p_a/D) < 1. \]

where \( W \) denotes the wage bill in the industrial sector.

2. The Market for Industrial Products

Demand for industrial products in a developing economy typically comes from three sources. The first is from the government or from urban classes like the bureaucracy, government service and white collar professionals, who are powerful constituents of the government of the day. Sanyal, Mukherji and Patnaik (1990) have argued that this demand, although price-elastic in the short run, is inelastic in the medium run. The argument is that following a price rise, government ministries and departments make adequate provision in their next budget not only for maintaining their own real consumption but also of most of their articulate constituents.\(^5\) The second source of demand is from industrial workers. Assuming that they do not save, their demand for industrial product is equal to their wage bill minus what they spend on food. Thus the revenue to industry from this source depends on the industrial wage bill and agricultural prices, and not on industrial prices. The third component of demand is from agricultural proprietors. It depends on their income and is price elastic. If the first component dominates total industrial demand, then overall demand for industry becomes price-inelastic in the medium run for a range of values of elasticity of demand of the third component.

In a theoretical model with these characteristics, an oligopolistic price hike in industry from a given equilibrium situation will reduce demand, revenue and profits in the short run. But in the following period (or over the medium run, depending on how we periodise the problem) the first component of demand picks up. The resulting increase in revenue can compensate both for its fall in the first period and for the interest costs of holding more than average inventory over the period, if the price hike is sufficiently high. In general it can be shown (see Sanyal, Mukherji and Patnaik, 1990, and also Langlois 1989a and 1989b) that if the first component of demand is sufficiently large, then for a given interest rate, price hike above a

\(^5\) The process works through formal indexation of compensation, and routine revision of allowances, fees, perquisites and sundry payables.
certain value is profitable. The higher the interest rate, the higher is the cost of inventory holding in the interlude between the price hike and the moment when demand has adjusted to it. Therefore at high interest rates only large hikes are profitable. But large hikes are generally precluded by two reasons:

1. The hike must not encourage entry of potential firms to the industry.

2. The hike should be tolerable to the government of the day and not embarrass it. Default may lead to falling out of favour with the government, and sometimes retaliatory import of substitutes by state trading organisations.

Thus low interest rates provide an enabling environment for small price hikes, and a sequence of periods with low interest (and easy availability of credit, see below) is expected to generate a low but steady inflation of industrial prices. High interest rates would usually raise profitable hike rates beyond strategic and political limits.

The nature and quantum of markup hikes and their implication for the inflationary process are further discussed in the next section. It should be noted for the time being that though the level of a profitable hike is a function of the interest rate, the feasibility of the hike requires credit to be available. A price hike will be associated with a dip in cashflow in the short run because of higher short run elasticity, and credit or credit assurance from the banking sector is necessary for the price hike to be operational. The overall result is that the exact increment in the markup during a period is a function of the prevailing interest rate while the availability of credit determines if a hike takes place at all. In short, the monetary and liquidity situation has a strong bearing on the inflationary process.

The industrial market can now be described formally. We write price as $p_i$.

\[
(3) \quad p_i = (1 + m + m')w
\]

where $w$ is the nominal wage rate, $m$ is the markup element at the beginning of the period and $m'$ is the markup hike effected during the period.

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6 Sanyal, Mukherji and Patnaik (1990) demonstrate this result using a microeconomic model of an oligopolist maximising profit over two periods. Industrial demand in that model comes only from the first source listed in the text. Those results are valid in the presence of an elastic component of demand as well, as long as the overall demand is inelastic in the medium run. This needs that the first component of demand should dominate. See also Langlois (1989a and 1989b) for similar results in a different context.
The flow equilibrium of this market can be written as follows:

\[
(4) \quad p_i Y = p_i E + p_i B(p_a D, p_i) + (W - p_a D) + c_i(p_i - w) Y
\]

where \( Y \) is real product of the industrial sector, \( c_i \) is the consumption propensity of industrial capitalists, \( E \) collects together all autonomous expenditure, and \( B(p_a D, p_i) \) denotes demand from agricultural proprietors. The partial derivatives of \( B(.) \) are positive and negative respectively. Equation (4) can be easily converted into an expression involving the equilibrium profit earned by capitalists:

\[
(5) \quad s_i (p_i - w) Y = p_i E - \{p_a D - p_i B(p_a D, p_i)\}
\]

where \( s_i = (1 - c_i) \) is the average saving propensity of capitalists. The left hand side expression is the savings of capitalists, and the two expressions on the right hand side are the autonomous expenditure and savings of the agricultural sector. On the left hand side, \( (p_i - w) Y \) is the equilibrium profit of industry. The observations about oligopolistic profits can be recounted in terms of this equation. Since \( B(p_a D, p_i) \) is elastic with respect to \( p_i \), and \( E \) is also so in the short run, an increase in \( p_i \) will reduce the right hand side and therefore industrial profits of oligopoly in the short run. On the other hand if the equilibrium is worked out over a longer period, \( E \) can be treated as invariant, and a price hike increases the left hand side if \( E \) is large compared to \( B(.) \) and its elasticity.

3. Interaction Between the Two Sectors and the Inflationary Process

Equations (1) to (4) determine the variables \( Y, p_a \) and \( p_i \). In this model, agricultural stock holding, \( S_a \), and the incremental markup, \( m' \), of the industrial sector are crucial. In the ongoing conflict over income shares, the two classes assert themselves through two different types of strategic instruments, the agricultural sector through its stock holding and the industrial sector through the setting of its markup.

Agriculturists can increase their gross income \( p_a D \) by increased stock holding. But \( p_a D \) also depends on industrial prices. A higher industrial price level generates a smaller real industrial demand, and therefore a smaller wage bill, given nominal wage rates. This has a tendency to reduce the gross income of agriculture. Also a higher industrial price in any case reduces the real value of agricultural income. Likewise a higher agricultural price reduces demand for industrial products by workers, and therefore the income of oligopolists. The final result of the different feedback effects depends on the attendant parameter values, and can be easily examined by referring to the matrix of partial derivatives of the two-equation system.
As argued in the two sections above, changes in both \( p_a \) and \( p_i \) in any given period, ceteris paribus, depend on the credit situation - the rate of interest and the quantities available to the two sectors. Credit markets in developing economies show substantial fragmentation because of differential credit limits imposed on sectors and activities by the authorities. Fragmentation is further increased by the existence of informal credit markets. The result is a variety of situations faced by the two sectors: either, both or neither may face a credit constraint at any given time. They often also face different interest rates. It is the configuration of rationing and interest rates which will have a large bearing on the relative movements of \( p_a \) and \( p_i \).

Constructing a formal model of inflation from these considerations is difficult. The conflict modelled here is only one of the two major bilateral conflicts in the inflationary process. The other one between industrial workers and capitalists generates the core of the process, as it is usually modelled in the literature cited above. A fully fledged model of inflation featuring both conflicts should superimpose the present considerations on a standard model of worker-capitalist conflict. The formalism of the present discussion which takes the nominal wage rate as a parameter cannot be extended to discuss such a synthesis formally. While that can be amended by changing the formal structure of the model, a more enduring difficulty is that the variety of rationing and interest rates faced by different classes as influenced by the government's budgetary compulsions and short-run political alliances and the nature of present and expected harvests can be endogenised only by abstracting from substantive issues. A generalised theoretical model of this process, therefore, appears inadequate. It is more appropriate to explain a specific inflationary episode rather than set up a long-run model of inflation in this situation. However in all such episodic discussions the usual inflationary sequence of nominal wage rate and markups chasing one another remains an invariant component of the analysis.

4. Autonomy and Endogeneity

The nature of money supply creation and its relation to the inflationary process is best understood by imagining that the considerations underlying the equation system in (1) to (4) are superimposed on the familiar process of industrial wage rate and markup chasing one another along a growth path of the economy. Central banking in a developing economy is almost inevitably described by monetary authorities as an exercise at keeping money supply responsive to the 'genuine' needs of the economy, while trying to curb credit available for stockpiling over the normal. It basically implies that central banks have a systemic obligation to respond to the demand for money by and large, but they also retain a certain autonomy for credit control at the margin. If we imagine the government in a developing economy to represent an alliance of several classes, the ability to control credit (like several other powers
that the government exerts on the classes within the alliance) provides the government as an institution with some autonomy from the classes it represents. Such autonomy is necessary for disciplining the classes it represents and holding the alliance together. The larger part of money supply conforms to the rhetorical description of the 'genuine' requirements of the economy and is determined endogenously by changes in wage, output and price level. But the other, a much smaller part, is determined by the mode of exercise of authority of the political system, punishing, rewarding or disciplining its own constituents as it thinks fit and expedient at any point of time. This is the part which may or may not be created, or granted to one player rather than another, in an apparent show of political authority and this part governs much of the movements of relative prices. The long run or trend growth of money supply determined by wage demands and general movement of prices is thus an endogenous process as described by many post-Keynesian scholars (see, for example, Dow, 1993, Moore, 1988b, Rousseas, 1986, and Wray, 1990, for recent treatments), but on top of this endogenously growing supply there is another part responding to political lobbying and influence.

Though the latter component is small compared to the endogenous part of money supply, its influence on the inflationary process may be very significant. Having allowed one player the ability to raise its price (directly through markup, or indirectly through stock financing) in one period, it permits a rise in the costs of all others, and thus legitimises the claim for a 'genuine' demand for credit of these others in the next period. Thus the 'genuine' demand is itself partly made up of a series of lagged responses to the discretionary credit creation of earlier periods. The importance of the phenomenon in the dynamics of inflation is therefore more than the measured ratio of the two components of credit in any given period.

5. Conclusion

The question whether money supply constrains the decision of a particular class primarily depends on the relation of this class to the institutions or classes whose liability functions as money. The endogeneity of money supply in a capitalist economy derives from the relation between capitalist borrowers and the state whose liability serves as the primary link in money supply. As pointed out by Gedeon (1985-86), Kregel (1984-85), Lavoie (1984) and Minsky (1980, 1981 and 1985), the reason why the supply of credit does not generally constrain spending lies in a set of institutional and political factors rather than in the nature of money or any compelling logic of the market process. Gedeon, for example, narrates a set of institutional arrangements quite different from those documented for capitalist economies, which used to lead to the endogeneity of money supply in the then Yugoslavia. Just as the configuration of political relations lead to endogeneity in many instances, it might also lead to
the use of money and credit as a constraining influence on certain classes in other circumstances. The present paper tries to illustrate this point by reference to developing economies where the nature of somewhat unstable political relations between classes and the state leads to a dualism in the behaviour of monetary authorities - their obligation to supply credit flexibly with the growth of overall need of the system, and at the same time its use as an instrument of political manoeuvre.

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