

A CLASSICAL THEORY OF THE INFORMAL SECTOR*

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I INTRODUCTION

The continuing crisis of the 1980s has promoted the informal sector to prominence in the literature on developing economies. But while the informal sector is now well studied from an empirical/historical point of view, the theoretical literature is sparse.¹ Recent contributions (Stark, 1982; Chaudhuri, 1989; and Rao, 1991) have begun to provide the foundations of a theory of the informal sector and this paper continues this project.

The unifying principle which underlies the previous literature is that the informal sector arises from the capital-limited nature of the economy. Were capital not in short supply, all activity would be formal. This paper investigates the question of whether the informal sector would persist in a world with only circulating capital.

The model, which follows Staffa (1960), is based on the notion that informal sector processes are processes which will not return the average rate of profit when evaluated at the prevailing level of wages and prices. Informal sector processes will not be operated by capitalists who, by definition, require the average rate of return. Ultimately, the economy is limited by an exogenously given level of demand which forces unemployed workers into the informal sector. Thus, informal sector producers are neither capitalists nor workers but rather they constitute a distinct social class. Which processes will be operated formally *versus* informally is seen to be non-trivial and depends on the position on the wage-profit line. In the short run, informal sector processes may earn positive or negative profits but, in the long run, the implicit wage in the informal sector determines the formal sector wage rate.

The characteristics of this dynamic adjustment path are considered to see if the informal sector tends to disappear in the course of capitalist development. If the initial conditions are appropriate, the informal sector

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¹ See Portes *et al.* (1989) and Tokman (1978) and the sources cited therein.

processes will eventually earn the average rate of profit, becoming in effect formal. But it is also possible that this adjustment path is blocked so that the model converges to a long-run equilibrium in which both formal and informal sector processes co-exist.

The policy issue considered is whether the state could tax formal sector capitalists to support informal producers at their existing level and then allow the formal sector to replace informal sector production. A theorem shows that the social surplus will fall if the informal sector uses less capital per unit of output than the formal sector. Since this condition is likely to hold, we conclude that while the informal sector will not necessarily lead to capitalist development, it may serve as a social buffer in its absence.

The paper is organized along the following lines: the next section discusses the general theoretical framework integrating some of the stylized facts that the model will incorporate and discusses the problem of identifying which processes are formal *versus* informal. Section III provides the details of a complete, although simplified, formal model. Section IV discusses the question of surplus transfer and the effect of the informal sector on the general rate of profit. The concluding section draws together some general themes of the paper.

II BACKGROUND

Due in part to the global economic crisis of the past decade, the size of the informal sector has exploded in almost all developing countries, except for the most dynamic of the South-East Asian countries. Estimates of its size vary with the fuzziness of the concept and across countries but representative numbers place almost half the urban workforce in developing countries in the informal sector. For example, in Castells and Portes (1989), estimates of the proportion of the EAP in the informal sector range from 22 per cent for Argentina to 55 per cent for Peru. Similarly, Liedholm and Mead (1987) report that 35 per cent of manufacturing employment in Jamaica takes place in firms with fewer than 10 employees while this figure is 90 per cent for Sierra Leone.² Thus despite much lower labour productivity in the informal sector, this sector still accounts for a sizable portion of GDP in developing countries.

As a generalization, informal sector technologies are rudimentary and labour productivity is characteristically low. "Overhead" or fixed capital is minimal and intermediate inputs, especially imports, are not nearly as plentiful as in the formal sector. Capital productivity can be so low, however, that fixed and intermediate input coefficients can be *higher* than in the formal

²The size of the production unit is often taken as a proxy for the informal sector due to the categories used in data collection.

sector. Various studies show that the marginal commitment of financial capital to create a job is a fraction of that of the formal sector, leading policy-makers to think of the informal sector as a "cheap means of employment creation".³

As suggested above, no generally accepted theory of the informal sector exists and certainly none which can account for all the available stylized facts. In what follows, we develop a theory which is consistent with the view that (i) the growth of the informal sector is linked to conditions of capitalist development; (ii) the technologies employed by the informal sector cannot be characterized easily, except that they tend to be labour saving on the whole.

III WAGES, PROFITS AND PRICES

The theoretical framework developed here to account for the informal sector is adapted from Sraffa's theory of non-produced means of production. As in the simple Sraffian system, there is only circulating capital and the level of effective demand is given exogenously.⁴ The theory of non-produced means of production allows for two production processes to simultaneously produce the same good. The justification of multiple processes is the scarcity of some non-produced means of production, for were all inputs freely reproducible, only one process—the cheapest at the prevailing level of wages and profits—would be employed. Scarcity is relative to a given level of effective demand and this permits the introduction of a more expensive process to operate along side of the cheaper one.

Two processes may in fact cooperate, even if there are no scarce means of production, so long as the unit costs plus profits are the same. Typically one process will be cheaper at a given level of wages and profits but, if the rate of profit in the informal sector process is free to fall below the general rate of profit, nothing prevents its operation along side of the formal sector process.

The informal sector is defined as processes which, at prevailing wages, will not return the average rate of profit in the long run. Informal sector producers operate these defective processes because they have no alternative. If these individuals cannot find more remunerative formal sector employment, they are reduced to informal sector activity as their sole means of reproducing themselves. Thus, there is "full employment" in the model, but not in the

³In Latin America it is estimated that the average informal sector job requires \$500, while this figure is closer to \$20,000 for the formal sector (Carbonetto and Carazo de Cabellos, 1986).

Likewise, data in Liedholm and Mead (1987) indicate that the average amount of capital in small enterprises ranges from \$654 in Sierra Leone to \$4,225 in Jamaica.

⁴Compare Kelley (1990) who considers a structuralist model in which demand is endogenous and is able to obtain some interesting comparative static results.

neoclassical sense of flexible wages and formal labour markets. Full employment obtains for social and biological reasons; everyone in society must be committed to some productive activity, whether they are employed in the formal or informal sector. Clearly, the presence of government welfare and unemployment compensation programmes in developed countries explains the relatively small size of the informal sector in these countries⁵

Informal sector producers deprive capitalists of the profits that they would earn if all demand were satisfied formally. Capitalists cannot prevent the informal sector from encroaching upon their markets since, even if capitalists lowered their prices, the informal sector would have no alternative but to match the lower prices. Market shares would remain constant despite capitalists' efforts to remove informal sector producers. Ultimately, it is the inadequacy of final demand which prohibits the formal sector from making offers of employment to all informal sector workers. Because inadequate final demand prohibits the formal sector from employing all informal sector workers, formal sector capitalists must release some proportion of the surplus to their informal competitors.

What prevents informal sector producers from operating capitalist processes which *do* return the average rate of profit? The short (but incomplete) answer is nothing. If informal sector producers earn the average rate of profit, they join the formal sector. But the economy, by definition, is demand constrained, which implies that not all production will be formal. Some individuals will not find employment in the formal sector and thus have to operate informal processes.

In the short run, the wage is taken as exogenous and, by definition, the informal sector profit rate is less than the formal rate. The total return to informal sector producers is an imputed formal sector wage plus the informal sector rate of profit where the latter can be positive or negative. If the informal sector rate of profit is negative, it is more remunerative to be employed in the formal sector than to operate an informal process. Nothing prohibits a positive profit rate in the short run, however, so that it is temporarily advantageous to operate an informal process. In the long run, per capita

⁵The definition in the text differs from more commonly-used conceptions of the informal sector. Hart (1973) and Portes *et al.* (1989) define the informal sector as the non-wage or unorganized sector of the economy while Carbonetto and Carazo de Cabellos (1986) identify the informal sector by productivity differences. Mazumdar (1976) and de Soto (1989) use a legalistic definition where the emphasis is on excessive government regulation that forces firms to operate on the boundary of the law in the informal sector. In empirical work, estimates of the informal sector are frequently based on income level or firm size which either conflates the informal sector with the poor or imposes some arbitrary limit on the size of informal enterprises. Data on the size of the informal sector reviewed in the first part of the paper do not refer to the definition in the text but to the implicit definitions of the surveyors. Thus, many of those included as part of the informal sector on the basis of common definitions would not be counted under our formulation and *vice versa*.

earnings in the informal sector govern the formal sector wage. The informal profit rate must therefore be zero in the long run.⁶ Whether a process is operated formally *versus* informally depends on the prevailing level of wages. Formal and informal processes may switch and reswitch as the wage changes. To make this idea more precise, let a single-product technique be defined as (A, L) where A is a square, n -dimensional matrix of circulating inputs and L is an n -dimensional row vector of labour requirements. In principle, there is associated with each method a set of alternative processes which may be operated informally. Competition among informal producers will eliminate all but the best alternative process. To begin the discussion, assume there is only one sector for which an alternative process is available; the case of many techniques will be investigated subsequently.

Fig 1 shows two wage-profit lines corresponding to two techniques which differ by only one method.⁷ The techniques corresponding to the wage-profit lines denoted by A and B in Fig. 1 consist of entirely formal processes in that each process earns the average rate of profit. The wage-profit line is then derived in the usual way with the dominant technique defined as the envelope of the wage-profit lines corresponding to each technique (Pasinetti, 1977).

At an initial, exogenously given wage rate above the switchpoint, technique A determines the formal sector rate of profit. The rate of profit would be lower if capitalists employed the alternative method. Below the switchpoint, technique B is dominant for the same reason. Traditionally, competition is invoked as an explanation for why the inferior method of production is abandoned (Mainwaring, 1984). Here, the alternative process is not abandoned, but is operated by the informal sector. Note that the wage-profit line for the informal sector is distinct from the inferior technique since its rate of profit is determined for a given wage rate by the set of relative prices associated with the dominant technique. Unlike the wage-profit lines for techniques A and B , the informal sector wage-profit line may have some upward-sloping segments and cross the wage axis more than once.

The alternative process, when evaluated at the dominant set of relative prices, could never appear more profitable to an individual capitalist. A theorem, proved in the Appendix, shows that if capitalists were to evaluate the informal sector process at the going wage and profit rate, its costs would necessarily be *higher* than the formal sector process. This would prevent

⁶Clearly, this assumption is no more realistic than any other long-period assumption. One could just as reasonably assume barriers to entry to the informal sector that would allow a positive rate of profit there. Empirically per capita income in the formal sector is observed to be higher than that of the informal sector, which may be explained by efficiency wage or queuing considerations (Bowles, 1985).

⁷We invoke the standard Sraffian assumption that the level of output is given. This assumption will be relaxed below to allow for the full-employment and demand constraints.

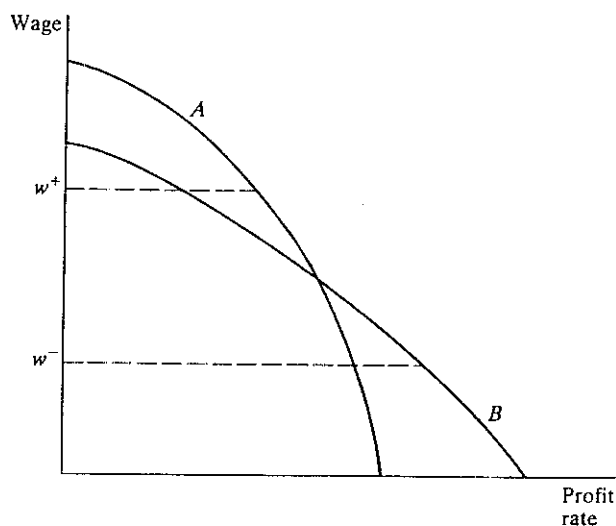


Fig 1

capitalists from adopting the alternative process. The theorem is crucial to the theory in that it ensures that the informal sector process will indeed correspond to an inferior technique.

In principle, then, either of the alternative processes can be formal or informal and both processes will be operated formally at switchpoints. The issue that arises is whether there exists an adjustment path along which informal processes eventually become formal. If so, it could then be argued that the informal sector does indeed provide a "seedbed of capitalist growth" in that it consists at least in part of nascent firms, struggling to earn the average rate of profit but not yet succeeding.

First, note that if wage-profit lines *A* and *B* of Fig. 1 did not cross, there would be no possibility that a process and its alternate could both earn the average rate of profit simply because there would be no switchpoint. If the wage-profit lines cross, as in Fig. 1, matters are considerably more complex. If the wage rate were at w^- , two processes could eventually cooperate at the switchpoint. If at w^- , the alternative process pays a rate of profit which is positive and there will be upward pressure on the wage rate in the formal sector. The economy would eventually arrive at the switchpoint at which both processes operate simultaneously, earning a positive and equal rate of profit.

But notice that if the initial wage rate is w^+ , the economy will not converge to the switchpoint. Consider various possibilities. If at w^+ the alternative process pays a zero profit rate, the economy is then immediately

in long-run equilibrium as defined above. On the other hand, if the informal rate of profit is negative there will be downward pressure on the formal sector wage rate. But in order for the two profit rates to converge at the switchpoint, the informal profit rate must pass through zero. At that point, the adjustment process comes to an end and the economy reaches its steady state.⁸ The tendency for the informal process to develop into a formal capitalist process is blocked.⁹

A long-run equilibrium point immediately below the switchpoint cannot block the path to the switchpoint. The existence of such long-run equilibria cannot be ruled out but it is easy to see that they are not stable. Consider again the point w^- and let it be a long-run equilibrium. The profit rate in the informal process is then zero. For w^- to be a stable equilibrium, any increase in the wage rate must cause the rate of profit in the informal process to fall. Surprisingly, this rather reasonable requirement cannot hold immediately below the switchpoint.¹⁰

The argument is as follows: at the switchpoint, the rate of profit in the informal process is the same as in the formal process by definition of a switchpoint. Since the informal rate of profit is positive at the switchpoint, but zero in the equilibrium below, the wage and the profit rate must increase together as the switchpoint is approached. This implies that at a long-run equilibrium below the switchpoint the rate of change of the alternative profit rate with respect to the wage rate must be positive. The condition for stability does not hold.

At the unstable point, any small upward perturbation in the wage rate will send the adjustment process on its way up toward the switchpoint. On the other hand, if the wage drops slightly below the equilibrium point, there will be downward pressure on the formal sector wage, so long as the informal profit rate continues to decline with the wage rate. The wage rate will fall continuously until some social minimum is reached. Thus, at some exogenously imposed, low-level equilibrium the wage in the formal sector will be permanently above the implicit informal wage. If, as the wage continues to fall, the informal profit rate begins to increase again, a stable long-run equilibrium will be encountered below the switchpoint.

While nothing rules out the possibility of informal processes converting themselves into formal processes *a priori*, there are numerous barriers which must be overcome. The formal sector wage must be below a switchpoint and

⁸Since the change in the wage causes continuous variation in the profit rate, it is not possible for the economy to "jump" from one technique to another as it converges to the long run.

⁹If the rate of profit in the informal sector is positive, there will be upward pressure on the wage rate; the economy may indeed converge to a new, higher switchpoint, if it exists. The increase in wages must cause the formal profit rate to fall faster than the informal profit rate.

¹⁰The text implicitly assumes there is only one switchpoint as in Fig. 1. If there is more than one switchpoint, the argument must be modified to allow for a stable long-run equilibrium below an upper switchpoint but above a lower switchpoint. The conclusion that a switchpoint can only be approached from below still stands.

the informal profit rate must be positive in order to arrive at a switchpoint. But once there, it must be granted that switchpoints are themselves unstable. Any upward perturbation of the wage rate will cause the informal sector to re-emerge with initially positive profits. This will, of course, put upward pressure on the wage and cause movement away from the switchpoint. A fall in the wage rate, however, immediately returns the wage to the switchpoint. The equilibrium established at a switchpoint is, therefore, tenuous.

With upwardly unstable switchpoints, the system will tend to converge to a long-run equilibrium above the switchpoint. This must be true since the informal profit rate must fall to zero at some wage rate lower than the maximum for either the dominant or inferior technique.¹¹ At that wage, the profit rate in the formal sector will still be positive. Thus, whether the wage is initially above or below the switchpoint, there will be a tendency for the informal process to get "stuck" in zero-profit long-term equilibria. The informal sector will come to appear as a permanent feature of underdeveloped capitalism.

We now turn to consider briefly the case in which there is more than one alternative process. Not every process need have an alternative but there are at least two alternative processes which may be operated informally. In the traditional approach to the problem of choice of technique, the presence of multiple alternative processes produces no new conceptual problems. Dominant techniques differ at switchpoints by only one method of production. Two pairs of processes could operate at a switchpoint only by fluke since, for a given wage, pairs of processes will become equiprofitable at different profit rates. Competition will generally eliminate the inferior method in all but one pair of processes.

When accounting for the possibility of informal activity, however, it is no longer possible to rely on competition to rule out multiple alternative processes. At least in the short run, there may be several informal processes associated with each of a number of formal processes. Over time, however, it may be reasonably assumed that for any given process only one informal process will become dominant.

It is natural to argue that in the long run informal workers will eventually abandon all but the most profitable informal process. If so, then the simplifying assumption employed above is the logical outcome of the process of competition. The principal implication is that the disappearance of the informal sector is a two-stage process. First, there is pressure to abandon all but the most profitable informal process; second, if that process pays a positive (negative) profit, there will be upward (downward) pressure on the formal sector wage as described above. It is in this last stage that the conversion of

¹¹A proof of this proposition is available from the authors upon request.

the informal process to a formal sector process may be blocked. Thus, only by fluke would multiple informal processes exist in the long run.¹²

IV THE INFORMAL SECTOR AS A RESERVE ARMY

Perhaps the most basic feature of the model as it has been developed so far is that the informal sector behaves as a reserve army of unemployed. To pursue some of the implications of the approach, return to the simplifying assumption that there is only one good, the j^{th} , for which both formal and informal processes coexist. This assumption is again relaxed below. The model is demand constrained and is in a stable long-run equilibrium as described above. The crucial new assumption is that the informal process is labour intensive relative to the formal process.

To say that the two processes cooperate implies that the informal sector cannot produce all the required output even if it displaces the formal sector and absorbs the labour previously employed there. On the other hand, the formal labour-saving process could not employ all the available labour since it would over-satisfy the given level of demand.

It might be expected that an increase in demand for the j^{th} good would cause both formal and informal sector output to rise. In fact, the informal sector shrinks and the formal sector expands. The argument is straightforward. First assume there are no intermediate goods. If the output of both processes increased to meet the additional demand, the employment constraint would be violated. Employment in the remaining sectors of the economy must be fixed if they are to satisfy their own demand. Thus, only the output of the labour-saving process can increase while that of the labour-using or informal process must fall.

If there are intermediates present, the demand for all basic goods will rise as the formal sector expands. This will draw labour from the informal sector, increasing further the necessary production of the formal sector. Since changes in formal sector employment follow changes in output, we conclude that the informal sector serves as a reserve army of surplus labour.

Note that there is no change in prices or the real wage as the economy expands to meet the increase in demand. As employment in the formal sector increases due to the shift in demand, income per worker in the informal sector does not change and, thus, neither does the real wage. There is no tendency for the formal sector wage to change and prices remain constant.

The rate at which the formal sector expands is inversely proportional to the difference in the labour productivities of the two methods. This can be easily seen as follows: if the two labour coefficients were the same, rearranging output from one sector to the other would have no effect on

¹² There are additional implications of multiple alternative processes discussed in the following section.

total production. If the labour coefficients differ slightly, a given reallocation will produce only a small increment in overall output. Hence, a given change in demand will require a larger reduction in informal sector output and a greater increase in formal sector output if the labour coefficients are similar. Thus, as the productivity in the informal sector approaches that of the formal sector its membership will become less stable.

An increase in demand for any other good in the system causes the j^{th} formal sector output to rise and the informal sector output to fall. With the rise in employment in another formal industry (and thus all basic industries) less labour is available to meet the increase in the demand for the j^{th} good. Labour must therefore be reallocated from the informal sector to the formal sector to satisfy the demand for the j^{th} good. This is true even if there are no intermediates. For reasons that should now be obvious, a rise in labour productivity in any other industry will cause an increase in informal sector output. The formal sector profit rate will rise but the change in total formal sector profits is ambiguous (formal output falling)

A small change in labour productivity in the informal sector around the long-run equilibrium causes output in the formal sector to fall as the output of the informal sector increases. If there were no reallocation of labour, the demand constraint would be over-fulfilled as informal productivity increases. To lower output, labour must be reallocated from the formal sector to the informal sector. The higher labour productivity in the informal sector raises per capita income and increases the formal sector wage. Thus, labour-saving technological change in the informal sector causes both total profits and the rate of profit to decline in the formal sector. The same technological change in the formal sector causes the formal sector profit rate to rise with an ambiguous effect on total profits.

Similarly, growth in the labour force will cause an increase in informal sector output and a fall in formal sector output, redistributing the surplus away from the formal sector. The new entrants into the labour force must be absorbed and, with demand given, the low productivity process must expand while the high productivity process contracts. Steady domestic population growth will consume the surplus and erode the economy's growth potential.

Informal sector producers tend to reduce the exploitation of workers in the formal sector. If formal sector capitalists produced all output, the resulting unemployment would put downward pressure on the wage. The surplus appropriated by formal sector capitalists would then rise due both to the increase in formal sector output as well as the lower wage rate. On the other hand, if informal processes exist which pay a positive rate of profit when evaluated at the formal sector wage there will be upward pressure on the formal sector wage rate.

Even if informal processes do not return a positive rate of profit, the informal sector can have a progressive impact on the distribution of income.

Note that without the informal sector there will be a persistent excess supply of labour which drives the real wage toward the social/biological minimum mentioned above. But if an informal sector exists, the lower bound on formal sector wages is the implicit wage paid by the informal process which may or may not be above the social/biological minimum. As long as the informal process is sufficiently productive to pay the socially minimum wage, it can be said that the informal sector is a barrier to the superexploitation of formal sector workers.

We conclude that the relationship between the formal and informal sectors, even in this simple framework, is quite complex. Workers are better off with the possibility of operating non-capitalist processes. To the extent that the informal sector encroaches upon formal sector activity, capitalists lose the opportunity to appropriate surplus and thus are worse off. On the other hand, if informal processes evolve into formal processes, the rate of profit in the formal sector as a whole will decline since switchpoints can only be approached from below. This provides a theoretical explanation for why the informal sector is often chained by a systematic web of government restrictions. In the following section, we investigate the conditions under which the economy as a whole is better off when the state has the ability to limit informal sector production.

It is clear from the foregoing that the informal sector redirects potential surplus from the formal sector to itself. Were formal sector capitalists permitted to produce all the required output, profits would rise but employment would fall. The issue which arises is whether it would be possible for the state to impose a tax on formal sector producers and the proceeds used as a transfer to maintain per capita informal sector income at its current level. The state would then prohibit informal sector production and allow the formal sector to meet total demand. The formal sector would then be better off if total formal sector profits rose. If capitalists paid no tax, profits would rise with output. But it is unclear that if capitalists were forced to pay an "unemployment tax" profits would suffer.

The primary implication is that an interventionist state could actually improve profits of the private sector while maintaining the living standards of the urban poor. The question addressed here is whether informal production serves as an efficient means by which to maintain living standards of individuals who would be otherwise unemployed.

It can easily be seen that formal sector profits, net of an unemployment tax, increase as formal sector output grows if and only if non-labour costs per unit of output in the informal sector are greater than in the formal sector. Otherwise, formal sector profits will fall as it expands to replace the informal sector. The unemployment tax ensures that the income of the working class is constant whether the output is produced by the formal or informal sector. This implies that the total deduction from the net product of the formal sector is also constant with respect to the distribution between formal and

informal sector output. Thus, any change in surplus is due to different rates at which inputs of circulating capital are utilized in the two sectors. Specifically, if at current prices the informal sector uses more inputs per unit of output, the surplus appropriated by formal sector capitalists will increase with the expansion of the formal sector.

This result implies that the informal sector must redistribute surplus from formal sector capitalists in order to pay for its inefficient use of non-labour inputs. Otherwise, eliminating the informal sector would not allow the surplus to rise. If, on the other hand, the informal sector uses inputs efficiently, informal sector production contributes to the surplus so that its elimination is now costly. As the informal sector disappears, the surplus appropriated by the formal sector declines.¹³

The condition that non-labour costs per unit of output in the informal sector are greater than in the formal sector will be true independently of the level of the wage rate so long as the informal sector uses more of every good per unit of output. But it is clearly possible that some intermediate uses in informal sector production will be greater than in the formal sector and others less. Changes in relative prices will then cause the condition of the theorem to be met at one level of wages and profits, while not at others. It is therefore impossible to conclude that the informal sector uses capital more or less "efficiently" independently of the distribution of income.

If there exist alternative processes for more than one formal process, matters are more complex. An increase in demand for the j^{th} good will not necessarily cause an increase in formal sector output and a contraction in informal sector output. The argument proceeds as follows: we begin with a given allocation of labour. The informal sector wage is no longer unique so that wage adjustment cannot play any important role in the argument.

To obtain the reserve army result seen above, we need only add the assumption that the flow of labour into the branch of production which has experienced an increase in demand be limited to that necessary to satisfy the increase in required output. Consider various possibilities, all under the assumption of no intermediates. Clearly, if there is no inflow of labour, the

¹³The result is cast in terms of non-labour costs per unit of output but it is easy to see that labour productivity also matters. A straightforward way to express the condition is to note that if formal sector profits grow faster than the unemployment tax, the social surplus must expand as the formal sector encroaches upon the informal sector. To see this, note that if the labour coefficients were equal, shifting labour from the informal sector to the formal sector would not increase output and no unemployment tax would accrue. But with lower productivity in the informal sector, both the real wage throughout the economy and the burden of the unemployment tax would be lower. It is thus more likely that an expansion of the formal sector will raise the surplus when the difference in labour productivities is greater.

reserve army result continues to hold since the formal sector may only draw labour from its corresponding informal sector.

There is nothing that the formal sector can do to reduce the employment in this branch of production; it has no power to force out informal labour. On the other hand, if employment increases, there exists the possibility that the formal sector could actually contract. If employment in the j^{th} branch does indeed increase, all other industries must increase the intensity of formal sector activity to compensate for the decline in the output of their informal counterparts. In these circumstances, it is unclear whether the proportion of the labour force involved in informal activity will rise or fall.

It can be shown that if the increase in informal sector employment in the industry which has experienced an increase in demand is less than or equal to that necessary to satisfy the new demand, formal sector employment in the economy as a whole will rise. This is evident since the formal sectors of all branches must increase their output and employment while the formal sector of the j^{th} branch either expands or fails to contract. The reserve army result thus holds whether or not the economy is in long-run equilibrium.

If there are intermediates present, an increase in demand will cause the output of all basic commodities to rise. The corresponding informal sectors will then contract. If the contraction is greater than that required to meet the increase in demand, there will be outmigration of labour. If the flow of labour into any industry is in excess of what is necessary for the higher level of output, the corresponding formal sector will contract. Again, the result is indeterminate. On the other hand, if the labour flow into all sectors is less than what is required by the increase in demand, no formal sector will contract. When intermediate goods are present, the added assumption is that none of the sectors of the economy experiences an inflow of labour greater than that required to satisfy the increment in demand.

Finally, consider the question of wage adjustment to long-run equilibrium in an environment with multiple informal processes. As informal participants are attracted to informal activities with higher implicit wages, the corresponding formal sectors will contract. The case in which all formal sector activity in a given industry ceases due to the attractiveness of the informal rate of profit in that industry cannot be ruled out *a priori*. In this situation, the informal process will be the only process producing the good, but the price will still be determined by the inoperative formal process. This must be true since any attempt to raise prices will induce formal sector producers to come back into the market and undersell their informal competitors.

The informal profit rate in the branch in question will determine the direction of change of formal sector wages. But note that, with multiple informal processes, the associated change in the structure of relative prices could conceivably cause some other informal profit rate to increase to the point that labour begins to flow in its direction. "Chattering" sequences are admissible in which informal participants are so numerous that no branch

of production enjoys sufficient demand to employ all informal workers. If so, then there is no long-run solution, flukes aside.

V CONCLUSIONS

The purpose of this paper has been to set forth a theoretically coherent view of the informal sector. It is to be stressed that the theoretical definition of the informal sector advanced here is not necessarily isomorphic to those commonly encountered in the applied and policy literature, a literature which tends to be *ad hoc*, undisciplined and marred by inconsistencies. Consequently, there are significant differences between the coverage of our concept of the informal sector and other commonly-used definitions.

Franks (1989) usefully surveys five different criteria that have been employed to define the informal sector in the literature: firm size, type of employment, technological/capital level, income level and legal status. Here, firm size is irrelevant, as is the sector in which the firm participates. Similarly the type of employment has no bearing on the formality/informality of a production process. Our notion could conceivably include some job categories that are not normally considered informal. The present definition is closest to the school which holds that informal producers use inferior technologies. But while our producers have access to the superior technology, they cannot use it for lack of effective demand. Neither do income levels have any bearing on informality. Given the wage dynamics of the model, our informal sector may have high, medium or low incomes in the short run. Finally, the present paradigm says nothing about the legality or illegality of informal production.

The framework discussed in this paper is, however, consistent with the fundamental tension in the applied literature. For some, the informal sector represents a vibrant band of small-scale entrepreneurs who will eventually emerge as the foundation for capitalist development. This view is opposed to the "reserve army of unemployed" approach which sees the informal sector as surplus labour to be absorbed in the process of growth and accumulation. The model developed here is consistent with either outcome but finds that there are substantial barriers in the transition to an all formal economy.

The theory allows for the informal sector to mature into its formal counterpart so long as the distance between the formal and informal processes is not too great and the wage rate is sufficiently low. The informal sector may be a "seedbed" but its growth can easily be stunted even under the conditions of a classically competitive economy. We conclude that the informal sector is likely to be a durable aspect of underdevelopment, not to be confused with dynamic industries in their early stages of development.

The principal conclusion is that the informal sector, as defined here, may well serve as a partial antidote to the regressive tendencies in the distribution of income which capitalist development engenders. Accordingly, whether the state should undertake to tax capitalists and redistribute the

proceeds to informal sector workers is unresolved. If the informal sector uses more resources per unit of output, the social surplus will expand as the formal sector replaces the informal sector. The outcome, however, depends upon the existing distribution of income, which further complicates matters

APPENDIX

Let p_j be the price of the j^{th} of n goods, a_{ij} is the amount of the i^{th} good to produce one unit of the j^{th} good l_j is the direct labour coefficient for the j^{th} good. The dominant technique provides a solution for the system of relative prices and the profit rate, r , with the wage rate taken as unity:

$$p_j = (1 + r) \sum_{i=1}^n p_i a_{ij} + l_j \quad i, j = 1, 2, \dots, n$$

and the numéraire determined by:

$$1 = \sum_{j=1}^n p_j q_j$$

where q_j are arbitrary semi-positive weights. This system has the solution (p_j, r) .

An informal process exists for the k^{th} good, with its rate of profit determined by:

$$p_k^* = (1 + r^*) \sum_{i=1}^n p_i^* a_{ik}^* + l_k^*$$

together with the equations:

$$p_j^* = (1 + r^*) \sum_{i=1}^n p_i^* a_{ij} + l_j \quad i = 1, 2, \dots, n; j = 1, 2, \dots, k-1, k+1, \dots, n \quad (1)$$

$$1 = \sum_{j=1}^n p_j^* q_j \quad (2)$$

gives a solution (p_j^*, r^*) . Since the first system is dominant, $r^* < r$. *Proposition:*

$$\sum_{i=1}^n p_i a_{ik}^* + l_k^* > \sum_{i=1}^n p_i a_{ik} + l_k$$

i.e., costs in the informal sector process are higher than in the formal sector when evaluated at the dominant set of prices. *Proof:* Assume the opposite

$$\sum_{i=1}^n p_i a_{ik}^* + l_k^* \leq \sum_{i=1}^n p_i a_{ik} + l_k$$

By the Okishio theorem (1961), the solution for the rate of profit if capitalists were to adopt the informal sector process would then be $r^* \geq r$. Since this contradicts the assumption that the first system is dominant, we conclude that costs must be lower in the formal sector than in the informal sector process

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