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Micro Models of Labor Migration:
An Alternative Approach Applied to Lesotho*

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Migration of labor from a household production based rural sector to modern and/or urban sectors of the economy is a pervasive phenomenon in economic development. However, there has been little theoretical work on this process, explicitly taking account of the fact that it involves individuals separating themselves from producing units organized in households. This paper develops an approach to dealing with this aspect of the phenomenon, based on micro analysis of the optimizing conditions for representative households. The qualitative results of the analysis are compared with actual experience in an African economy long characterized by widespread migration of this type, namely Lesotho, and are found to be consistent with historical patterns of structural change. The paper concludes that the approach holds promise.

I. Introduction

Temporary labor migration is a very widespread phenomenon, which has received considerable attention with respect to its impact on economic development.[1] It is clear that both temporary and permanent migration is closely related to the economic development process throughout both history and the world.[2] Generally, however, economists have paid comparatively little attention to the detailed theoretical underpinnings of the

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1 See, e.g., Boehning ed. (1982) and numerous publications sponsored by the International Labor Office (ILO).

2 See, e.g., Todaro (1976), Kelley and Williamson (1984) and Brinley (1958).

decision by individuals to migrate, and the implications for economic activity in the area of outmigration.

Usually, theoretical discussion revolves around two basic ideas. One, associated with Todaro, argues that individual migration decisions are based on comparisons of expected income in the alternative locations. The other views migration itself as an investment decision, and approaches migration from a human capital point of view. Both ideas produce predictions which are qualitatively supported by empirical work, e.g. that migration flows will be sensitive to both income differentials and the probability of employment, and that the young, more educated, and single will be more likely to migrate than the old, less educated, and married.

However, approaches that focuses on the individual decision to migrate omit consideration of a feature of reality that was central to W. Arthur Lewis' original thesis on the transfer of labor between sectors in development countries,[3] namely that most individuals who migrate are, before migrating, members of households engaged in economic activity where the enterprise coincides with the household. The purpose of this paper is to explore an alternative approach to the migration decision that takes explicit account of this feature, set against the empirical example of an economy that has extreme experience of temporary migration, namely Lesotho.[4]

The structure of the paper is as follows. The next section will briefly summarize some of the empirical features of the Lesotho economy that are difficult to explain using common theoretical approaches. A short section on the purposes and uses of modeling follows. Then we will develop the outlines of a micro based model that facilitates explanation of the macro features in question. This is followed by some brief conclusions.

II. The Lesotho Case

Lesotho is a small country in Southern Africa, entirely surrounded by the Republic of South Africa. In 1986, it had a population of about 1.6 million, a land area of about 30,000 square kilometers, and GNP per capita of about $370.[5] It is an ethnically very homogeneous Kingdom, the

3 See Lewis (1954).

4 There are distinct parallels between the approach taken here and that found in Low (1986), but also important differences. Low's work is strongly recommended to those interested in this topic.

5 See World Bank (1988).

country being known as Lesotho, the people Basotho (singular Mosotho), and the language Sesotho. The country is mostly mountainous, and the defensible terrain, together with the political and military skills of its nineteenth century founder, Moshoeshoe the Great, and the tenacity of its people, enabled it to become a separate British colony, and in 1966 an independent country, rather than being incorporated into one of the larger Southern African colonies or South Africa itself.

The broad outlines of Lesotho's economic structure are well known and documented and need not be discussed in detail here.[6] The object of this paper is to explore the possibilities of modeling the major features of that structure in a way that permits a better understanding of the evolution of the structure.

Lesotho's economic structure is unusual. There can be legitimate disagreement over whether the unusualness is a matter of qualitative difference or merely a matter of degree, some features common to many former colonies having been extended to extreme levels. Such disputes need not concern us here. The purpose of this section of the paper is to describe the features of the economy that we want to explore.

First, however, we need a rough sketch of the structure we seek to understand. Lesotho is unusual, we will argue, for two main reasons. First, its economy is dependent on the temporary export of labor to a greater degree than that of any other country, and this has been its situation for a very long time (at least since around 1900). Second, its government revenue is unusually dependent on the level of imports, and this has also been true for some time. On this second point, the percentage of government revenue in Lesotho originating from the Southern African Customs Union Agreement has fluctuated in recent years between 53 and 70%.[7] The World Bank reports that on average, the percentage of total central government current revenue coming from taxes on international trade and transactions was, in 1986, 28.1% in low income economies other than India and China (among which the Bank classifies Lesotho).[8] Lesotho is thus unusually dependent on imports for government revenue. This apparent dependency is not due to government being relatively unimportant in Lesotho; the World Bank reports government revenue as a percentage of GNP as 21.9% in Lesotho, above the World Bank's average of 15.4% for low income economies other than China and India in 1986.

On the former point, the very heavy dependence on export of tem-

6 See e.g., ILO, JASPA (1979) and Bardill and Cobbe (1985).

7 Molapo (1984) and on the Customs Union, see Cobbe (1980).

8 See World Bank (1988).

porary migrant labor, there is a large literature and little to be gained from reviewing it here.[9] It will suffice to sketch very briefly some of the characteristics of these labor flows, how they have affected the economy, and how they have changed recently.[10] By the 1930s at the latest, it was considered normal for half the adult male labor force to be absent from the country working in South Africa. Many always worked in the gold mines, at wages which until the 1970s were insufficient to permit subsistence for an average sized Basotho family. Prior to around 1960, there were substantial movements of permanent migrants — i.e. migrants who, whatever their initial intentions, did not return. Most such found employment outside mining, as did many temporary migrants until the mid 70s.

During the 70s, important qualitative changes occurred in these labor flows. Legal permanent migration was already not possible. Temporary migration for employment outside mining became increasingly difficult, and eventually legally foreclosed except for those with longstanding relationships with employers. Meanwhile, the real wages of migrants in mining increased very substantially between about 1973 and 1976, transforming the nature of the labor market situation of the gold mines. Mining employment changed from something always available at a very low wage to smething that, after 1979, was chronically difficult to obtain for an inexperienced Mosotho, but which paid something now relatively quite attractive by Lesotho standards.

The effects of this experience of migration on the structure of the Lesotho economy are not entirely clear. Perhaps it would be more accurate to say that the extent to which some of the features of Lesotho's economy should be attributed to the labor migration process, as opposed to, say, the policies of the colonial authorities or the general process of incorporation into the Southern African economy, is not clear. Nevertheless, some striking features of Lesotho's economy have been apparent for some time, and plausibly can be connected to the labor migration phenomenon.

Feature one is the state of agriculture. Other causes clearly are relevant, but the lack of incentive to devote effort to agriculture has been remarked on at least since the 1930s.[11] By the late 1970s, this lack of incentive — compared to the return to effort from migration — for potential mine workers was extreme. To repeat, agriculture faces other problems too, but its relative stagnation, if not decline, in recent decades is very striking. World Bank data suggest real value added in agriculture fell in

9 See Cobbe (1982).

10 Greater detail on recent changes is found in Cobbe (1986).

11 See Ashton (1939).

the 1970s, and food output per capita declined 16% from 1969-71 to 1980-82. The second feature is the structural distortion of the Lesotho economy, both on the production side and on the expenditure side. Briefly, services are overdeveloped, and industry and particularly manufacturing strikingly underdeveloped, compared to other countries of comparable size and income level. For 1982, the World Bank estimates that 6% of Lesotho's GDP originated in manufacturing, and 55% in services, compared to 17% and 42% on average for lower middle income and 9% and 40% for low-income economies other than China and India. On the expenditure side in 1982, private consumption in Lesotho was 146% of GDP and gross domestic savings minus 77% of GDP, with the overall "resource balance" (the differnce between exports and imports of goods and non-factor services) being minus 106% of GDP (this means that imports exceeded exports by more than domestic output!); the corresponding averages for all lower middle-income economies are 70%, 17%, and minus 6%; for low-income other than China and India, 86%, 5%, and minus 8%.[12]

We could go on giving much more detail about some of the peculiarities of the structure of Lesotho's economy, but for present purposes that would be unnecessary. The major points are established. Lesotho has an amazingly open eonomy in aggregate, with total expenditure over double domestic output; these expenditures are substained by migrant earnings and foreign aid flows; government is an important source of domestic expenditures, but relies for its revenues on import flows; agriculture is relatively stagnant and manufacturing stunted. Next we wish to discuss how this structure might be modeled.

III. Modeling

Economics depends very heavily on models, either implicit or explicit. however, very frequently model-builders skate over why they build models. This is unfortunate since, in the spirit of "horses for courses," a model which may be highly appropriate for one purpose may be totally inappropriate for another. Consider in this context three different purposes a model builder might have in mind. The first purpose is to understand the past. This can be represented either as a noble quest for historical truth or as a sterile source of academic dispute, but however one views it one cannot study regions such as Southern Africa without realizing that enormous effort has been expended on the elaboration of models

12 All data from World Bank (1984).

designed to illuminate and explain the historical evolution of the social and economic structures that now exist.

A second possible purpose is to predict. If one can predict the future, then one can, perhaps, both anticipate it and shape it somewhat differently. Economic models as a means of forecasting and predicting the future have had a bad press recently, especially in developed countries, but the twin facts remain that there is a demand for forecasts of the future, and that if they are not pure guesses, such forecasts must be based on some form of model, naive or sophisticated, implicit or explicit.

Thirdly, one can attempt to build models with the explicit intention of offering a tool to the policy maker. Such models are to some extent a combination of the former types, although their purpose is different. A policy model has to combine some ability to predict with some plausible structure for why what it predicts will come about: to quote one of the most prolific economic modelers of developing economies,

> .... a model is a black box for policy if its builders cannot or do not explain the factors determining the general character of its results, or show how its recommended targets can be achieved using available policy tools. Any sensible policy-maker will ignore model results which do not satisfy these elementary conditions. Fortunately for the world, most policy-makers (though perhaps not most model builders) have this degree of common sense.[13]

The three different purposes also very frequently are associated with widely different time frames and types of phenomena and data that are of relevance, despite the obvious interrelations between them. Ideally, both forecasting and policy models would be built on a deep and accurate understanding of the structural processes of the economy, and this would encompass the models designed to illuminate the latter. In practice, modeling often does not happen that way. Models designed to improve understanding tend to take a long view, and to emphasize qualitative and structural features of the economy that may be totally unamenable to quantitative measurement. At the other extreme, forecasting models tend to focus solely on what is quantifiable, to take a relatively short view, and to abstract enormously from actual economic structures and processes, concentrating on aggregates. Policy models are often in between: they must have some plausible structure, some cause and effect hypotheses, but also must usually incorporate some quantification and a fairly short to medium term time perspective.

[13] See Taylor (1979).

This paper is not going to survey attempts to model labor reserve economies in general, or even Lesotho's particular case. For example, it will make no assessment of the fairly sophisticated modeling based on closed-and-open-loop feedback mechanisms attributable to Ray Thompson.[14] Instead, in the remainder of this section, brief allusions will be made to the two most common approaches to models of the first type, attempting to explain the development of structure. Then we will outline an alternative approach to this type of modeling, in the next section, and show how it is consistent with the macro features, and shifts in them, of the Lesotho economy.

Typically, attempts to 'explain' the structures of the Lesotho economy and their development have been based on largely verbal and often somewhat implicit models representing the two main schools of thought in economics, namely the neoclassical paradigm and the Marx-influenced tradition. Both types of model, although they can tell stories that are plausible and illuminating about the evolution of the structures of the Southern African economy as a whole, are usually rather unsatisfactory in terms of explaining the internal dynamics of the labor reserve economy, and Lesotho's economy in particular.

Models based on the Marxist tradition tend to concentrate on the development of the capitalist core of the Southern African economy, and on the use of state power to bring about conditions that permitted that core to flourish. In this kind of model, the migrant labor system is often seen as a factor that facilitated the growth and consolidation of the capitalist core by providing a low-cost labor force, whose full costs of reproduction did not have to be borne by its employers. The evolution of the system is seen as facilitated by exercises of state power which left those destined to become migrants with no viable alternative to migration.

Models based in the neoclassical tradition, by way of contrast, tend to downgrade the importance of state power and focus more on the voluntary response to market forces that developed as a result of differential comparative advantage, influenced by the location of mineral discoveries, and historically-given differential access to technology and capital.

As suggested, both types of model represent a way of thinking about what happened in the past in Southern Africa as a region, and of organizing data and events, that illuminate certain aspects of the process that occurred in the region and help understanding. But neither helps very much in understanding what happened within the labor reserve. Why did the

[14] See Thompson (1974).

labor reserve economy become skewed in its structure so heavily toward services? Why did the agricultural economy retreat from market participation toward subsistence? Why did some families become thoroughly enmeshed in the migrant labor system, while others appear to have been able to escape it for substantial periods of time? These and other questions are important to our understanding of both how the labor reserve economy in Lesotho evolved into what it is, and also how it operates now and may be expected to change in the future.

IV. Micro-Based Modeling

It seems at least plausible that if we are going to be able to understand better the internal dynamics of the labor reserve economy, some at least of our modeling will have to start not from the behavior of large aggregates but with the behavior of micro units, individuals and households. The behavior of aggregates such as sectors of the economy, imports and exports, migrant labor flows and investment patterns, and so on, is the result of the behavior of both the individual micro units and larger aggregates formed from them, such as states and corporations. Since it is of interest to understand how patterns of differentiation appear and change among these micro units, it makes sense to base attempts to understand these phenomena in considerations of the motivations of, and situations facing, such units.

However, this task is not at all easy, the facile generalizations of textbooks not withstanding. One of the major reasons for the difficulties is the ambiguity that surrounds the appropriate assumptions to make about the nature of the basic unit to conisder. Economists tend to blithely assume that they know what families and households are. Reality, unfortunately, does not always conform to the assumptions of economists. The concepts of family and household turn out to be neither equivalent nor unambiguous in virtually any society, and particularly so in Southern Africa.[15] This is clearly of some significance when individuals detach themselves from their households or families to become migrants, but continue some economic interactions with their origins. The tendency of economists is to assume that migrants 'belong to' in some sense a well-defined family and household that operates as an economic unit, to which the migrant sends what remittances he may, and to which the migrant returns after his contract. Anthropological and survey data suggest these assumptions are often wildly inaccurate. For example, Field reports that in

[15] See Kerver, ed. (1982) and Murray (1981).

his sample of Batswana migrants in South African mines, only 13.9% remitted to a single recipient; Batswana mine migrants were associated with an average of three other Batswana through remittances of money or goods.[16] Somewhat similarly, it is clear that the composition of households and families changes over time; this is of course the basis of the developmental cycle analysis of household behavior, applied with considerable insight to the Lesotho situation by Murray and Spiegel.[17]

Thus micro models based on analysis of unchanging households of which migrants are merely detached parts cannot hope to capture all of what is really going on. Nevertheless, they may be helpful first steps toward a different understanding of how the process of increasing participation in the migrant labor system affected economic structure within Lesotho. What follows is a model of this type, attempting thereby to "explain" some of the features of Lesotho's structural development. The analysis is preliminary and abstract. It argues in terms of various kinds of "typical" or representative households.

The household consumes three types of good and service. These are food (F), which is tradeable; locally-produced goods and services (Z), which are likely to be non-tradeables in the main; and imports (M), which are likely to be largely manufactures but may also include both food and services. Let us assume that F can be produced by the household using land and labor only; that Z can, at least initially, be produced using labor only; but that production of manufactures requires both fixed capital and access to technology that, at least initially, is not practicable for most households. Before contact with external markets, only F and Z exist, and consumption demands for them are satisfied by local production and exchange.

New goods in the form of M are now offered for sale by traders from outside. Some will be wholly new goods, others will be goods that substitute for Z's in function if not design or detail. The essence of the Z good model[18] is that households will obtain these goods by increasing their production of F (perhaps including "cash crop" agricultural products not previously produced or not exactly "food"), exchanging the excess, and reducing production of Z's for which M's now substitute.

However, the success of this process and now far it goes will depend crucially on the production possibilities facing the household and the economy as a whole. This is the first point at which resource endowments,

16 See Field *op. cit.*

17 See Murray (1981).

18 See Hymer and Resnick (1969) and Low *op. cit.*

access to technology, and institutions, begin obviously to influence what happens. The crucial issues concern the influences on the productivity of labor (both average and marginal product) in F production. Obvious influences are cooperating inputs (land, perhaps capital) and technology.

With respect to land, at least three issues are relevant. First, the total endowment of land, and thus the theoretical limit to land per worker. Second, the institutional arrangements with respect to land tenure, which will determine whether individual agricultural entrepreneurs are able to gain access to large parcels of land. Third, the alternative uses of labor available to the economy, which will influence how much labor seeks access to land.

Suppose that the land situation and static technology combine to produce a low average product of labor and, for increases in the labor to land ratio, a rapidly declining marginal product of labor in agriculture. Now introduce two alternative uses of labor. One is distant migration, to earn a wage w. The other is local cash employment. In Z production, earning a wage αw, where $\alpha < 1$, representing the disutility of being a distant migrant as opposed to just being a wage employee. Suppose further that w is fixed for our economy (e.g. by monopsonistic behavior of recruiting organizations), independent of how many persons offer themselves for migrant employment, whereas α, although fixed from the point of view of the household, does vary with shifts in demand and supply within the local economy.

The household now has to decide how to allocate its labor (h) between F production (L_f) and wage labor in either the Z sector (L_Z) or migrancy (m). If we assume institutional arrangements that prevent land being rented either in or out, this would seem a relatively trivial problem, apart from the fact that α is endogenous. However, such a view would overlook two important points about the real world that are likely to be almost universally true in such situations. First, the effective buying and selling prices at the farm gate for F production are likely to differ by a substantial margin, reflecting transport and transaction costs. This implies an important discontinuity at the household production level of F corresponding to household consumption of F. Second, wages may reasonably be assumed to be known and certain, perhaps, but F production in response to given inputs cannot be. The most striking feature of all agricultural production is its variability in response to weather conditions, pests, disease, etc.

Formally, ignoring for the moment the stochastic nature of F production, and assuming a household utility function U (Y, m) where Y is total income and m is labor time spent in distant migration, the problem is to maximize U subject to total labor use not exceeding that available, i.e. if:

(1) $Y = p.F + \alpha.w.L_z + w.m,$

(2) $F = F\ (L_f)$

(3) $m + L_f + L_z \leqslant h,$

maximize $U(Y, m)$.

Assuming all available labor time is used, it is easy to show that the first order conditions require:

(4) $$p\frac{\partial F}{\partial L_f} = \alpha w$$

(5) $$\frac{\partial U}{\partial m} = \alpha \frac{\partial U}{\partial Y}$$

if m, L_f, and L_z are all positive.

Interpretation is straightforward. The value of the marginal product of labor in agriculture must equal its opportunity cost, the local wage; and the marginal utility of time spent in distant migration is equal to the excess of distant wages over local wages times the marginal utility of cash income (recognizing that $\frac{\partial u}{\partial m}$ is negative, and $\alpha < 1$).

Table 1 shows the statements that can be made about the marginal product of labor in F production and the disutility of migration when not all of L_f, L_z, and m are positive. There are in all eight possible cases, remembering that we assume a wedge between buying (p_B) and selling (p_s) prices for F ($p_B > p_s$). It is reasonable to presume that there will be some households in each category since labor available per household, agricultural assets, and the disutility of migration are all likely to vary between households.

From the point of view of the household, αw (the local off-farm wage), p_s and p_B (selling and buying prices of food to the households, $p_s < p_B$) and w (the distant migrant wage) are all fixed and given. $\frac{\partial U}{\partial m}$ is a subjective judgment by the household that will be influenced by non-wage conditions of work in the migrant occupation.

Table 1

HOUSEHOLD TYPOLOGY

Case	Labor Allocation	MP_L in F $(=\frac{\partial F}{\partial L_f})$	
(i)	$L_f = h$	$> \alpha w/p_s$	$> (\alpha-1)\ (p_s/w)\frac{\partial F}{\partial L_f}\frac{\partial U}{\partial Y}$
(ii)	$L_f > 0, L_z > 0,\ m = 0,$		
	(a) selling food	$= \alpha w/p_s$	$> (\alpha-1)\ (p_s/w)\frac{\partial F}{\partial L_f}\frac{\partial U}{\partial Y}$
	(b) buying food	$= \alpha w/p_B$	$> (\alpha-1)\ (p_B/w)\frac{\partial F}{\partial L_f}\frac{\partial U}{\partial Y}$
(iii)	$L_f > 0,\ m > 0,\ L_z = 0,$		
	(a) selling food	$> \alpha w/p_s$	$< (\alpha-1)\ (p_s/w)\frac{\partial F}{\partial L_f}\frac{\partial U}{\partial Y}$
	(b) buying food	$> \alpha w/p_B$	$< (\alpha-1)\ (p_B/w)\frac{\partial F}{\partial L_f}\frac{\partial U}{\partial Y}$
(iv)	$L_z > 0,\ m > 0,\ L_f = 0$	n.a.	$= (\alpha-1)W\frac{\partial U}{\partial Y}$
(v)	$m = h$	n.a.	$< (\alpha-1)W\frac{\partial U}{\partial Y}$
(vi)	$L_z = h$	n.a.	$> (\alpha-1)W\frac{\partial U}{\partial Y}$

n.a. means not applicable.

The marginal product of labor in F production depends both on labor allocated to F, land available, and technology. Let us consider now the expected shifts of households between categories in response to changes in some of these variables, *cateris paribus.*

First, consider an increase in population resulting in lower land/worker ratios. If the proportional allocation of labor over the three different uses remained the same, this would tend to lower the marginal product of labor in agriculture. If food prices, w, and the disutility of migration remain unchanged, this will shift households from categories (i) and (ii) to (ii) and (iii) (and possibly (iv), (v), and (vi)), with a consequent increase in migration, m; and from (iii) (a) to (iii) (b), with a consequent decrease in marketed food output. Alternatively, if technical change in agriculture increases the marginal product of labor in F production, *ceteris paribus,* the response will be in the opposite direction, tending to reduce migration and increase marketed food output.

Second, consider the possibility that α falls, i.e. local wages become

lower relative to migrant wages. *Ceteris paribus,* households will shift from categories (ii) to (i), (iv) to (v), and (vi) to (iv) and (v). Local labor supply will contract, migrant labor will increase, and marketed food output will increase. If α increases, the shifts would be from (i) to (ii), (iii) to (ii), and (v) to (iv) and (vi). Migrant labor supply would contract, local labor supply expand, and marketed food output fall.

Third, suppose migrant wages w increase. Shifts would be from (i) and (ii) to (iii), and from (iii) (a) to (iii) (b). Migrant labor would increase and marked food fall. Local wage labor would not be affected if α were to remain unchanged, but if α simultaneously fell (i.e. local wages remain constant or lag behind migrant wages) local labor supply would also fall (movements from (vi) to (v) and (iv), (ii) to (i), and (iv) (v)) with some offsetting increase in marketed food output.

Lastly, consider changes in conditions other than wages affecting the utility of migration. If migration becomes less pleasant, $\frac{\partial U}{\partial m}$ falls (i.e. the discount factor — a number less than one — by which one multiplies becomes smaller). Households will tend to move from (i) to (ii) and (iii), (ii) to (iii), and (iii)(b) to (iii)(a). Migrant labor supply contracts, local labor supply expands, and marketed food output increases. Conversely, if $\frac{\partial U}{\partial m}$ rises (i.e. migration becomes less unpleasant), the shifts revese, from (i) and (ii) to (iii), (iii)(a) to (iii)(b), and (vi) to (iv) to (v). Migration increases, local labor supply contracts, and marketed food output also contracts.

Little of the above is at all counter-intuitive, and there may well be more elegant and rigorous ways to show the results. Nevertheless, the implications are interesting and tend to reflect experience in Lesotho. Notably, if agriculture remains technically static and institutions keep land fairly evenly distributed over households, population growth alone will lead to falls in marketed food output if migration at a constant real wage is possible; this is what happened prior to about 1972. Similarly, increases in real migrant wages (or the equivalent, improvements in non-wage conditions of migration), also will lead to falls in marketed food output. Further, if we assume to productivity change in agriculture, growth can come only from population growth, increases in real migrant earnings, or greater Z output. If greater Z output increases α (not rigorously necessary but plausible), marketed food output again falls.

This strongly suggests that a key determinant of what will happen in such an economy is what happens in F production, i.e. agriculture. It is here that one can posit that institutions, particularly with respect to land

tenure, may be important. An obvious example would be if more productive technologies in agriculture are not scale-neutral, but require land holdings several times the average to be economically feasible. If land tenure institutions make it impossible or difficult to assemble such parcels of land, the technical change may not be introduced although its technical feasibility is well-known. Infrastructure investments and marketing structures, to the extent that they influence the wedge between farm gate buying and selling prices, may also matter. If food prices basically net out to a port-of-entry price, as is likely if the region as a whole becomes a net food importer, the larger the food price wedge the smaller the incentive to plan for greater output than household self-sufficiency, and the greater the tendency to satisfy non-food consumption wants by selling labor for cash rather than food for cash.

Let us now turn to examining what sort of evolution of the structure of such an economy we might expect over time under alternative scenarios. The two scenarios will be (1) where population grows but the real migrant wage w remains constant, and (2) if the real migrant wage w grows over time.

If w remains constant but population grows, what happens in our economy will depend heavily on what occurs to marginal product of labor possibilities in F and Z production. These in turn depend on technology, institutions and infrastructure (influencing in particular the ability to take advantage of scale economies), and capital formation. Obviously many outcomes are possible. Consider the extreme case in which retuns to labor effort in F production tend to shrink because of static technology, little or no capital formation, low infrastructure investment and institutions inhibiting establishment of large scale units; and Z production remains competitive only in extreme non-tradables for similar reasons. Over time, the economy will tend to evolve in the way Lesotho did from the 1930's to around 1970. Real per capita income would stagnate or fall; marketed agricultural output would fall and migration increase; and non-agricultural domestic output would become heavily skewed toward the extreme non-tradables, such as retail and wholesale trade.

Second, suppose that with everything else unchanged, w starts to rise. Total and per capital income rise, marketed agricultural output falls further, and what happens beyond that depends on the interaction of two sets of conditons. First, rising per capita incomes will result in greater consumption, and changes in the structure of consumption demand reflecting preferences of the population and the distribution of income. Following Engel's Law, normal expectations would be that demand for basic foodstuffs would grow only slowly, demand for higher quality food faster,

and demand for manufactures and some services faster still. Higher incomes would also imply greater ability to finance capital formation, and the second set of determining conditions of the outcome would surround the production possibility set for Z production. If technology, institutions, and infrastructure permitted, more items might enter the set that could be competitively produced, and Z production would expand and diversify toward import-substitution and the high income elasticity of demand services, shrinking the shares of imports in total consumption and of commerce in domestic output. But there might well be a substantial time lag between the increase in incomes and the growth of domestic output; and if conditions were unfavorable, it might never amount to much. In any case, the initial reaction would be a surge in imports since the domestic economy would not have the capacity to increase output as migrant earnings expanded. Again, this describes quite well what happened in Lesotho after real migrant mine wages in South Africa increased markedly in the mid 1970's.

The above model does not have the detail required to illuminate some of the most interesting processes, such as the mechanisms of changing differentiation within society. But it does suggest that models based on reasoning about micro units, rather than aggregates, can help our understanding of structural change.

V. Conclusion

Migration is a pervasive feature of economic development. It occurs in many different ways, and many different settings. One setting, clearly very common throughout Africa, and particularly in Southern Africa, involves individuals detaching themselves from households engaged in agricultural activities, initially not necessarily on a permanent basis. This paper shows that consideration of the optimization conditions for households in this situation can help to understand the structural changes that occur in the macro economy as this process continues.

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