ENTREPRENEURSHIP AND ECONOMIC DEVELOPMENT

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Scholars concerned with problems of economic development have tended either to ignore the entrepreneur or to enshrine him as the prime mover of the economic universe.

This dichotomy in approach is hardly surprising since conventional economic theory assumes—and in the absence of a central planning board, requires—the presence of profit maximizing entrepreneurs, calculating profits with lightning speed and unerring precision. Indeed, the entrepreneur in this schema is not easily identified with flesh and blood, but is rather a deus ex machina. This is not to deprecate economic theory but merely to agree with Baumol that while the theory of the firm is useful for many purposes it leaves no room for treating entrepreneurship in other than a trivial way. [4]

On the other hand, many social scientists have had occasion to observe that in some underdeveloped economies there appears to be a lack of response to economic incentives. They have turned to psychological or sociological explanations for the emergence (or lack of emergence) of entrepreneurial groups. [38, 14] Hagen expresses the position quite well when he states that "In a traditional society in which nothing has yet occurred to change traditional personality and culture, an increase in the size of the market or in the flow of saving available is not apt to have a great effect in inducing continuing change in technology." [22]

The purposes of this paper are two. First, to present a conceptual framework for analyzing relationships between social, political, and economic variables; entrepreneurship and economic growth. And secondly, to present some empirical findings from Nigeria.
Although many definitions of entrepreneurship have appeared in the literature, a common thread running throughout the various discussions is that the entrepreneur is a decision maker. It seems most useful to identify entrepreneurship with the function of making decisions with regard to levels of production and productive techniques (the "what" and "how" of elementary economics) rather than solely with individuals. As such, the function may be carried out by an individual or by a group. It may involve producing novel goods, or finding new means of producing familiar goods—this is innovational activity. It will usually involve creating additional productive capacity prior to undertaking production—thus bearing considerable risk. It may involve expanding production along familiar lines—yet imitative activity too requires decision making. The actual decisions made in any economy will range from difficult to easy, from "once in a lifetime" to routine. However nice it would be to distinguish between important and routine decisions, between innovation and imitation, it is virtually impossible to draw a dividing line that is operationally satisfactory, because the decisions made in any economy form a continuum and any division is at best arbitrary.

The tasks that must be performed by entrepreneurial units if decisions are to be effective include: perceiving productive opportunities, gaining control over other factors of production, organizing productive facilities, and in some cases managing the continuing operation of the operation of the productive facilities. It may be desirable to separate the last task from the others, but, again, it is in practice difficult to separate management from decision making.

The relationship between entrepreneurship and economic development should at once be apparent. Other things being equal, an economy with a
larger supply of effective decision makers will make better use of its potential resources since they will be combined more efficiently and will be used for more productive purposes. (This is the principal argument of Hirschman. [27]) It is also clear that for a given level of entrepreneurial resources an economy will achieve higher levels of output if it has greater endowments of resources and potential opportunities for growth are more favorable.

One way to attack the problem analytically is to treat entrepreneurial resources as a factor of production. This has been suggested by Harbison [23] and I have worked it out in some detail earlier. [24, Ch. 2] As between conventional factors, there are relationships both of substitutability and complementarity between entrepreneurship and other factors. Following from a standard production-function approach, demand for entrepreneurial resources can be derived as a function of price and a supply function for the factor can be specified. Such a model leads one to consider factors affecting both the demand for and supply of entrepreneurship. Broadly speaking, economic factors determine the "demand" for entrepreneurship while social and psychological forces along with economic factors determine the supply. Some interesting propositions can be derived from the comparative static and comparative dynamic properties of such a model that are parallel to familiar propositions relating to accumulation of conventional factors such as capital or labour. [24, Ch. 2]

However, such a model fails to come to grips with the difficult problems of imperfect markets and uncertainty. On the basis of casual empiricism, one is inclined to believe that the market for entrepreneurial services is particularly imperfect. Individuals who were "fustest with the mostest" appear to reap rewards in excess of what could be considered rent for
superior skill alone. Luck plays at least some part. In our definition of entrepreneurship, the first function listed was the perception of opportunities; this is a necessary and important function only if information concerning opportunities is limited and imperfect. It is the fact that entrepreneurial decisions are necessarily taken under conditions of uncertainty that makes the study of entrepreneurship interesting.

With a production-function approach, one can identify equilibrium quantities and prices determined by the intersections of demand and supply curves only if a single price prevails for all units of the factor. If instead, one wishes to consider a heterogeneous group of projects, each with a different rate of return, it is possible to determine neither how many of these projects, nor which ones will be exploited without specifying some mechanism for linking particular entrepreneurial units with specific projects. Therefore it is desirable to formulate a model which explicitly takes into account the complications of non-homogenous projects, imperfect information, and risk.

Consider the objects of entrepreneurial decisions to be discrete projects which, if implemented, have the effect of increasing total output. They may require new investment or may consist solely of reorganizing existing productive structures. Each project can be completely described by its attributes which include expected payoff, variance of expected payoff, length of payoff period, necessary scale of operations, technical complexity, etc. Thus, each project can be considered to be a bundle of attributes denoted by a vector

\[ X_j = X_j(x_1, x_2, \ldots, x_k) \]

where \( X_j \) is the jth project and the \( x_i \)'s are scale values for each of the
5. k attributes, representing a point in a k-dimensional attribute space. The \( \mathbf{x}_i \) scales will be constructed so that a state with higher value will be preferred to a state associated with a lower value. Thus we assume that a higher expected payoff, a lower variance of expected payoff (risk), less technological complexity, and smaller scale of operation will always be preferred to their opposites.

Entrepreneurial functions are performed by decision units which may be individuals, households, or organizations, each of which is assumed to be able to order all attribute bundles according to the relations \( \mathbf{x}^0 \mathbf{P} \mathbf{x} \) or \( \mathbf{x}^0 \mathbf{P} \mathbf{x}^1 \), (the first meaning \( \mathbf{x}^0 \) is preferred to \( \mathbf{x}^1 \), the second meaning \( \mathbf{x}^0 \) is not preferred to \( \mathbf{x}^1 \)). Following conventional consumer theory, transitivity is assumed; that is, \( \mathbf{x}^0 \mathbf{P} \mathbf{x}^1 \) and \( \mathbf{x}^1 \mathbf{P} \mathbf{x}^2 \) implies \( \mathbf{x}^0 \mathbf{P} \mathbf{x}^2 \). These two assumptions (or axioms) together imply a total ordering of the entire set of attribute bundles (projects) by each decision unit. Let us also assume a continuous, order preserving, monotone function, \( u^k(\mathbf{x}) \), such that \( u^k(\mathbf{x}^0) \geq u^k(\mathbf{x}^1) \) if and only if \( \mathbf{x}^0 \) is ordered before, or on the same level as \( \mathbf{x}^1 \) by the kth decision unit (\( \mathbf{x}^0 \mathbf{P} \mathbf{x}^1 \) or \( \mathbf{x}^0 \mathbf{P} \mathbf{x}^1 \) and \( \mathbf{x}^1 \mathbf{P} \mathbf{x}^0 \)). These assumptions imply the existence of a system of indifference surfaces, which are assumed to be convex to the origin.

In a world of imperfect information, no decision unit is able to ascertain the full universe of potential alternatives. Instead of choosing between all possible alternatives, a decision unit usually is faced at any one moment with a single opportunity for which a decision to act or not act must be made.

Let us assume that each decision unit determines some critical indifference surface \( u^c \). We then define the set \( A_k \) such that if \( \mathbf{x}_j \in A_k \), \( u^k(\mathbf{x}_j) \geq u^c \) where \( u^c \) is the critical indifference surface and \( A_k \) is the action set of the kth decision unit.
The following simple, but not implausible, decision rule can be postulated: if the kth decision unit perceives a potential project \( X_j \), it will be acted upon (exploited) if \( X_j \in A_k \); if \( X_j \notin A_k \) it will not be acted upon. Figure 1 depicts the action set of the kth individual projected on to a two dimensional plane (all other attributes being of specified and unchanging value). For purposes of illustration, \( x_1 \) can be the expected profits, and \( x_2 \) an inverse function of the variance of the expected profits, hence a measure of risk. The action set, \( A_k \), is represented by the shaded half-space, containing all projects such that \( u^k(X_j) \geq u^k_c \). Hence, if either projects \( X_i \) or \( X_j \) (which have associated levels of preference, \( u^k_i \) and \( u^k_j \) respectively, each \( > u^k_c \)) were to come to the attention of the kth decision unit, they would be exploited. If \( X_0 \) (associated with \( u^k_0 < u^k_c \)) were to be perceived as a potential opportunity, it would not be exploited.

The position of the \( u^k_c \)'s depend on several factors including preferences, access to resources, skills, a subjective notion of the nature of opportunities that are likely to arise in the future, and on projects already being exploited by the decision unit. That is, a decision unit will decide not to exploit a project because it finds the particular project unattractive per se, because it thinks something better will be available in the future, or because its resources are already fully extended. Therefore a complication arises if \( X_j \) and \( X_i \) were observed simultaneously by decision unit k. It is clear that \( X_j \) would be preferred to \( X_i \) in such a case, but \( X_i \) also lies in the action set. Exploitation of \( X_j \) will most likely alter the position of \( u^k_c \) because organizational and resource constraints exist for most decision units.

One way to handle the problem is to assume that decisions are made seriatim. \( X_j \) is exploited, \( u^k_c \) shifts and \( X_i \) is exploited depending on whether or not it lies within the new \( A_k \). Perhaps a more satisfactory approach is to
Figure 1: The $k$th Decisions Unit's Action Set
consider three mutually exclusive projects; $X_1$, $X_j$, and a new project $X^*_1$ which consists of simultaneous exploitation of $X_1$ and $X_j$. It has frequently been pointed out in the literature that a complex of projects may afford possibilities of internalization of externalities and pooling of risks, hence the complex is different from the sum of its parts. The decision unit then chooses the one alternative that it ranks highest.

Another possible line of inquiry would be to introduce explicitly a cost of searching for alternatives and explore the conditions under which a decision unit will pay to obtain additional information. However, this promising approach will not be pursued further in this paper.\(^{12}\)

In this model, the exploitation of a project depends on the configuration of the $u^k_i$'s, the constellation of potential projects, and whether or not decision units perceive the potential projects. So far the problem has been perceived from the standpoint of the individual decision unit. Since economic growth is related directly to the number and kinds of projects exploited in a period of time, it will be useful to examine the model from the standpoint of the economy as a whole.

Suppose that the economy consists of $n$ decision units and at a particular moment there exist $m$ potential projects. What is the chance that any particular project will be exploited? We can write

\[
N(X_j) = \sum_{k=1}^{n} \theta_k \quad \theta_k = 0 \text{ if } X_j \notin A_k \\
\theta_k = 1 \text{ if } X_j \in A_k.
\]

where $N(X_j)$ is the number of decision units which would be willing to exploit the $j$th project if they became aware of its existence. A simple and not unreasonable assumption is that the probability that the $j$th project will be exploited will be a positive function of $N(X_j)$, the flow of information,
and the intensity of search for projects by decision units. This can be written as

\[
(X_j) = \rho_j[N(X_j), I], \quad 0 \leq \rho_j \leq 1, \quad \partial \rho_j / \partial N_j > 0, \quad \partial \rho_j / \partial I \geq 0,
\]

where \( \rho_j(X_j) \) is the probability of the \( j \)th project being exploited, and \( I \) is a variable representing both information and intensity of search by the decision units.

Therefore, expected increase in national output can be written as

\[
E(\Delta Y) = \sum_{j=1}^{n} \rho_j E(\Delta Y_j),
\]

where \( E \) stands for expected value \( E(\Delta Y_j) \) is the expected incremental output if project \( j \) is actually exploited, and \( \rho_j \) is the probability of its being exploited. It is important to note that while the \( \rho_j \)'s are normally dependent on private profitability, the \( E(\Delta Y_j) \)'s reflect social profitability. (If public sector decision units explicitly consider social profitability as their decision criterion, some modification of the model may be required.)

It is apparent that the expected rate of economic growth will be greater, the larger are the number of projects, the incremental output associated with each, and the \( \rho_j \)'s. In turn, the \( \rho_j \)'s will be larger, the greater are the \( N_j \)'s, the better the network of information, and the more intensive the search by decision units for projects.

Figure 2 shows the relationship between \( \rho \) and one attribute, \( x_1 \), which might be taken to be expected profit. With the population of decision units and their (not identical) \( u_c^k \)'s given, and for constant values of all other attributes, \( \rho_0 \) is seen to be monotone increasing function of \( x_1 \). That is, \textit{ceteris paribus}, the higher is the expected return, the greater is the probability that any project will be exploited. Similar reasoning can be extended
Figure 2: Probability of Exploitation as a Function of Project Attribute
to other attributes. This follows from the assumption that there is unanimity among decision units in ranking the order of preference of each attribute and that the $u^k_c$'s are not identical. (If the $u^k_c$'s were identical, $N_j$ would jump from 0 to $n$ at $u(X_j) = u_c$.)

An increase in the number of decision units, a shift towards the origin of some of the $u^k_c$'s, an improvement in the information system, or an increase in the intensity of search will shift the function upwards, say from $\rho_0$ to $\rho_1$.

So far it has been implicitly assumed that all decision units hold identical expectations of profitability, risk, complexity, etc., with regard to a particular project if they become aware of it at all. This, of course, begs the important question of how subjective views of the characteristics of a project are formed. Psychological studies of cognition and perception indicate that different individuals will hold widely divergent opinions about the objective characteristics of any object. However, it is beyond the scope of the present study to deal with this important matter. If the individual estimates of an attribute of a project are randomly distributed, the qualitative characteristics of this model are unaffected if the $X_j$'s reflect the mean values of the attributes. Alternatively, the problem can be avoided by assuming that there is an "objective" value of each attribute which is reflected in the vector $X_j$, and systematic underestimation or overestimation of an attribute by a decision unit is reflected in the position of its $u_c$. For instance, the $u_c$ of a decision unit which is consistently optimistic about expected returns will lie closer to the origin in the $x_1$ ("objective" expected return) direction than it would in the absence of optimism. This kind of assumption is necessary to locate projects in the attribute space and define the $N(X_j)$'s.
However, decision units will differ not only on their subjective appreciation of objective reality, but the latter will also differ among units. Any particular project will be more profitable for decision units with greater organizational skill or more favourable access to resources than for less favored decision units. Risk is appreciably diminished for decision units that are more diversified or that possess more accurate information about processes and markets. To the extent that a decision unit possesses general advantages, potential profitability will be enhanced or risk diminished for any project that it considers. Such differences may be accommodated through shifting their $u_c$'s closer to the origin; the relative positions of projects in attribute space is unaffected.

In this model, economic factors such as factor supplies, technology, effective demand, foreign trade possibilities, prices, and institutional arrangements, can be viewed primarily as determinants of the $X_j$'s. Changes in any of these variables will change the values of one or more attributes of any given project. Inventions will create new potential projects and/or shift the position of existing projects in attribute space. External economies will be reflected by exploitation of one project shifting the position of other project vectors, or by the definition of a composite project which will have a vector different from the sum of the component project vectors.

Projects which are dissimilar to presently exploited opportunities will involve a high degree of risk, *ceteris paribus*; hence, innovation can be considered as exploitation of high risk projects. It is then apparent that the act of innovation will reduce the risk component of similar projects, although it may either increase or decrease expected profit. Thus, imitative entrepreneurship can be viewed as exploitation of less risky projects, and within this framework, it is obvious that there will be more imitators than
innovators in any population of decision units.

Similarly, social and psychological variables will affect the position of the $u^k_c$'s. Changes in personality or societal values will become manifest through changing decision unit preference structures; "favourable" changes will shift the $u^k_c$'s toward the origin in the expected return, pay-off period, and risk dimensions. Changes in factor prices, hence in attractiveness of alternative occupations, will also shift the $u^k_c$'s in these same dimensions. Education and occupational experience will shift the $u^k_c$'s in the technological complexity and organizational scale dimensions.

The development of an organized capital market (or other credit institutions) will have the effect of shifting the $u^k_c$'s toward the origin in the scale of operations dimension; decision units will be enabled to exploit projects of large scale from which they had been precluded. If prestige is an operational attribute of projects (e.g., industry more prestigious than trade or agriculture), changes in societal values will be reflected in shifts of the $X^j$'s in this dimension. Increased intensity of search for entrepreneurial opportunities arising from changed personality or social values, or an improved information system will be reflected through a shift in the $\rho^j$'s for any given set of $X^j$'s and $u^k_c$'s.

The qualitative characteristics of this model are quite similar to those of a model in which entrepreneurship is treated as a factor or production within a production function framework. For the most part, variables that affect the demand for entrepreneurship in the one affect the $X^j$'s (opportunity set) in the other; variables determining the supply of entrepreneurship in the one determine the $N(X^j)$'s in the other. However, the model developed here explicitly introduces risk, imperfect information, and a probabilistic approach to matching entrepreneurial units with specific
projects. In addition, it deals with heterogeneity of projects and entrepreneurial units in a more satisfactory manner.

Models of this sort are useful to the extent that they provide a coherent framework within which entrepreneurship can be investigated. They avoid a single factor approach to economic development and help one to identify separately variables affecting the supply of and demand for entrepreneurship (or alternatively, the set of opportunities and the responsiveness to such opportunities).

This framework is capable of accommodating many different experiences. Papanek has reported a high rate of industrial growth in response to economic incentives in Pakistan where conditions for a vigorous entrepreneurial response seemed relatively lacking. In Greece there has been a long tradition of vigorous entrepreneurship, yet, according to Alexander, industrial growth has been disappointing because of problems in the economic structure. We can also think of examples such as the United States and England in which both the economic environment and entrepreneurial supply were conducive to rapid growth and of Burma where both factors seem prejudicial to growth.

In a somewhat similar vein, Papanek has aptly pointed out that

The development of industrial entrepreneurs results from the interaction of three forces— the strength of economic incentives; the values, institutions and political situation in the society as a whole; and the motivations of the potential entrepreneurs. The more favourable for the development of industrial entrepreneurs one or two of these factors, the less favourable can be the other one or two without affecting the results.
II.

The problem at hand is to derive propositions from the model that are capable of empirical test.

One group of hypotheses (each to be taken as a *ceteris paribus* statement) flow directly from particular project attributes and assumed preferences with respect to these attributes, and to determinants of the information variable. (The term "industry" refers to groups of projects having rather similar attributive values.) They are:

1. The rate of expansion will be higher in industries yielding higher current profits. The underlying assumption being that expectations adapt to realizations.
2. The rate of expansion will be higher in industries with less complex technology.
3. The rate of expansion will be higher in industries in which economies of scale are not great, hence requiring less complex organization and capital.
4. The rate of expansion will be highest in industries in which technological communication between the country and the rest of the world is most easily facilitated.
5. Innovations will be relatively rare but successful innovations will be copied quite rapidly. This process will drive down profits on similar projects and the rate of adoption will be slowed. This proposition rests on two assumptions. First, demonstration reduces the subjective element of risk associated with a similar project, and, second, information about a project existing in the country or region is more readily available than is information about similar projects existing only outside the country or region.
A second group of hypotheses are based on factors that should systematically shift critical indifference surfaces of some decision units either through affecting expected values of profit, skills and resources, or attitudes towards some attributes. In particular, the possession of certain skills and managerial abilities by a decision unit will make any project that it undertakes more profitable than if the same project were taken by another decision unit less well endowed. Also, projects characterized by large scale, high risk, or technological complexity will be undertaken only if they have differentially high expected profits. Therefore, propositions relating to decision units' critical indifference surfaces in the scale, risk, and complexity dimensions can be converted into propositions relating to expected profits. (Expected profits and realized profits are assumed to be positively correlated through operation of an adaptive expectation mechanism.) These hypotheses (also to be taken as ceteris paribus statements) are:

(6) Entrepreneurial performance will vary among ethnic groups, since ethnicity is usually considered to reflect differences in social structure, sanctions, and child-rearing practices which in turn condition an individual's (or group's) attitudes towards risk and affect modes of interpersonal relationships within an organization. These factors will also affect social and occupational mobility which are also determinants of the critical indifference surfaces.

(7) Entrepreneurs (or decision units) with high levels of formal education will be found to be earning high profits on the projects they have exploited. This follows from the assumption that education contributes to general organizational, managerial, and technical skills as well as to particular skills which affect the ability to undertake large and
complex projects. Education and willingness to take risk may be correlated; superior access to information may also reduce subjective risk.

(8) Entrepreneurs (or decision units) with greater experience will be found to earn high profits on projects they have exploited. The argument here is parallel with the previous one with regard to formal education. Experience should be considered both in terms of years and in the useable relevance of the particular experience for imparting useable skills and knowledge.

(9) Entrepreneurs (or decision units) that have innovated will earn differentially high profits. This is based on convexity of the action set.

(10) Entrepreneurs (or decision units) with access to credit or other sources of capital in sizeable amounts will earn higher profits than those who lack such access. This is based on the notion that access to capital is an important determinant of the critical indifference curve in the scale of operation dimension which is in turn related to profit through convexity of the action set.

(11) Entrepreneurs (or decision units) with good political connections will earn differentially high profits. This proposition is based on the fact that political connections are important for gaining access to resources, credit, and markets on favourable terms.

We now want to confront these theoretical implications with facts from Nigeria.
III.

The data used in this paper were collected through interviews with 269 Nigerian firms during 1965. For several reasons the sawmilling, furniture, printing, rubber processing, and garment making industries were selected for intensive survey. Several other industries including beverages, lime making, bone crushing, pipeline welding, metal working, electrical equipment, transport equipment, gramophone record pressing, brick making, sign making, perfume blending, and tanning, in which only a very few indigenous firms with more than 20 employees existed, were also included in the survey. Appendix I contains several tables which describe the characteristics of the respondent firms. Our best estimate is that this sample includes more than 90% of Nigerian-controlled firms with more than 20 employees in these selected industries and more than 30% of those firms with more than ten and less than 20 employees.

Mrs. Mary P. Rowe conducted all of the interviews in the Lagos area while I did all of the interviewing outside of Lagos. Each of the interviews was based on a prepared questionnaire using open-ended questions, and included questions about the history, activities, and current financial structure of each firm; management structure; sources of capital and technical information; future plans; special obstacles which had been encountered; and a detailed biography of the founder or principal decision maker in each firm.
Evidence from detailed studies of the sawmilling, furniture, rubber processing, printing, and garment making industries is consistent with the first five hypotheses. [24, Chs. IV-VIII; 26] Large numbers of Nigerians have been highly responsive to economic opportunities and incentives within the limits imposed by their particular technical, commercial, and managerial skills. Industries characterised by relatively high profits, simple technologies, and low investment thresholds have been expanded rapidly—more rapidly, in fact, than would appear to be economically optimal since most are working at rather low levels of capacity utilization. On the other hand, there has been relatively little private African participation in large-scale industrial activities which have been undertaken by expatriates and to an increasing extent by governments. The pattern of rapid adoption of successful innovations with attendant decline in profits has been striking in Nigerian industries and is consistent with hypothesis (5). Contacts with overseas firms have been important in determining the speed of expansion in rubber processing industries, while expansion of sawmilling and printing firms accelerated sharply after the establishment of Nigerian branches by equipment suppliers. These branches offer excellent service and training in use of their equipment as well as information and technical advice.

IV.

Propositions (6)-(11) each posit a systematic relationship between observed profitability of firms and observable characteristics of decision makers. (In the theory these characteristics are associated with decision units which may consist of several individuals while in the propositions these are characteristics attributable to individuals. Since the sample
consists of firms dominated in almost all cases by a single individual, this presents no particular problem. If the sample had included many multi-person decision units, definition and measurement of characteristics would have had to have been modified considerably.)

First, it might be useful to specify the form of the posited relationships more precisely. Each of the propositions should be interpreted as a ceteris paribus statement. A particularly simple form of the relationships arises if one assumes that the characteristics are independent of each other and that they affect the dependent variable, profitability, in an additive manner. This can be written symbolically as:

\[ (5) \quad Pr = C + a_1 \text{Ind} + a_2 \text{Eth} + a_3 \text{Ed} + a_4 \text{Exp} + a_5 \text{Inov} + a_6 \text{Res} + a_7 \text{Pol} + u \]

where \( Pr \) is profitability, \( C \) is a constant, \( \text{Ind} \) is specific industry or regional effects, Eth is ethnic group membership, Ed is education, Exp is relevant experience, Inov is innovational activity, Res is access to resources, Pol is political involvement, and \( u \) is a random error term. This is, of course, an extremely simple specification of the hypothesized relationships, but it does provide a useful and convenient starting point. The next problem is to devise operational definitions of each of the variables and to specify how they are to be measured.

Unfortunately, although the theory suggests some general qualitative relationships, there is little a priori basis for choosing the precise ways in which the variables should be measured. Therefore, one is forced to experiment with alternative measures to determine how sensitive the analysis is to choice of measure. Of course, such a procedure contaminates the results and reduces the extent to which one can claim to have tested the hypotheses.
The appropriate measure of profits in this model is of economic profit—earnings in excess of opportunity cost of all employed and owned factors. Thus it is an amount of profit rather than a rate, can can be viewed as a return to entrepreneurship or organization. However, it was impossible to obtain satisfactory data on profit from all of the firms in the sample.

However, our survey showed quite conclusively that retained earnings was by far the most important source of capital for expansion; thus it is likely that in Nigeria, the growth of firms and profits are closely related. Therefore, in the regressions I have experimented with various measures for the dependent variable. First, present size of firm, measured by employment or value of assets in both natural and logarithmic forms, have been used. This specification gives one measure of growth of the firm which is then regressed on a set of independent variables. Secondly, a direct measure of an average compound rate of growth of employment has been used as a dependent variable (a similar measure of growth of assets was used which gave similar results but is not reported here). Finally, we constructed a rather arbitrary and subjective measure of "success" of firms which attempted to take direct account of profitability as well as growth of the firm. None of the measures are ideal, but there is reason to believe that they provide at least a partial measure of the "true" dependent variable, profit.

The data consist of observations of particular establishments, but at least some of the variables such as education and experience should affect the profits of any undertaking by a particular decision unit. It may well be the case that a very successful entrepreneur maximizes his total entrepreneurial profit by diversifying his activities among several establishments.
And it may also be that he uses profits from one enterprise to finance rapid expansion of some other enterprise. Therefore, the growth of any particular establishment controlled by him may be a poor indicator of the profitability of that establishment and of his total entrepreneurial profit. It has also been argued by Kilby [29] and Schatz [45] that dispersal of activity over several businesses has been carried to an irrational extent by many Nigerian entrepreneurs. Both considerations lead one to expect that the measures of growth should be related positively with the proportion of the entrepreneur's assets devoted to the establishment included in the sample; therefore this has been included as an independent variable in the regressions.

The first five hypotheses all suggest that there may be systematic differences in profitability between industries. Therefore it seems appropriate to include dummy variables (equal to one if the observation is from the industry, otherwise zero) to capture specific industry effects. The rubber processing industry in Nigeria is exceptional in having the largest of the Nigerian-owned firms. The dummy variable for this industry is included in all of the regressions--none of the other industry dummies was significant.

Ethnicity is taken into account by including dummy variables for each of the major ethnic groups. However, only the variable representing the Ibo group proved to be significant; therefore all others have been dropped from the regressions.

The education variable is more straightforward. We have information concerning the number of years of formal education computed by each respondent. At various times we used the years of education in natural and logarithmic forms, a four level classification, and a dummy variable equal
to one if the entrepreneur completed six or more years of education and zero otherwise.

Experience is dealt with by a number of variables. First, the age at which an entrepreneur founded his business provides a measure of the number of years or prior experience. Secondly, dummy variables were included to reflect previous experience in trading or clerical work. (Dummy variables for craft experience or farming were not significant and were dropped.)

Innovation is handled rather easily by a dummy variable equal to one if the firm represented some form of innovation and zero otherwise. Approximately 20 per cent of the firms were classified as innovational where innovation refers to establishing a new process, product, marketing method, or business practice in the region.

Access to resources is represented by dummy variables equal to one if more than 25 per cent of initial or expansion capital was raised through loans. Size of the firm at time of founding provides another measure of resource availability. The final variable, political activity, is included as a dummy variable taking its value according to whether or not the entrepreneur has been actively involved in party politics.

Tables 1 and 2 present the results of several alternative forms of the regression analysis. Some relationships appear to vary systematically between Lagos and the rest of Nigeria. Therefore separate regressions were run and are reported here. The degree of explanation provided by the regressions is greater for each group taken separately than it is for the combined sample.
<table>
<thead>
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<th>Dependent Variable</th>
<th>(1) PEM</th>
<th>(2) LPEP</th>
<th>(3) PAST</th>
<th>(4) LPAS</th>
<th>(5) CGE</th>
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\(a_{t>1.0}\)
\(b_{t>1.3}\)
\(c_{t>1.6}\)
\(d_{t>2.0}\)
Notes to Table 1:

Definitions of Variables

Dependent Variables:

PEMP = Current number of paid employees
LPEP = Natural log of PEMP
PAST = Present value of fixed assets in thousands of pounds
LPAS = Natural log of PAST
CCE = Annually compounded rate of growth of employment in the firm since founding
EVAL = An index of subjective evaluation of the success of the firm based on growth and profitability (scale ranges from one for unsuccessful to five for very successful)

Independent Variables:

IEMP = Initial number of paid employees (at time of founding)
RUBB = Dummy variable = one if firm is in rubber processing
AITB = Percent of entrepreneur's total assets invested in this firm (measured in intervals of 10%)
IBO = Dummy variable = one if entrepreneur's native language is Ibo
OEDD = Dummy variable = one if entrepreneur has had six or more years of formal schooling
AGE = Age at which entrepreneur founded this firm (measured in five-year intervals)
SCLR = Dummy variable = one if entrepreneur's previous occupation was trading
INOV = Dummy variable = one if innovations have been initiated within this firm
ILN = Dummy variable = one if entrepreneur received 25% or more of initial capital through loans
EXLN = Dummy variable = one if entrepreneur received 25% or more of expansion capital through loans
POL = Dummy variable = one if entrepreneur has been active in politics

Note: The F test reported for each regression represents a test of significance of the entire regression against the null hypothesis that the value of the dependent variable is equal to its mean.
Table 2

Regression Coefficients—Lagos Respondents Only

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<th>(8) LPEP</th>
<th>(9) PAST</th>
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Notes to Table 2: Same as for Table 1.
Tables 1 and 2 present the results of two sets of regressions—one for the non-Lagos firms and one for the Lagos firms (Lagos is the capital and largest city in Nigeria)—using six different dependent variables and a common set of independent variables for each set of observations.

As expected, the coefficients of the dummy variable representing the rubber industry (including crepe processing and tire retreading) were large and, in most cases, highly significant (there were no rubber processing firms in Lagos). The rubber processing firms started on a large scale and have been highly profitable but have grown less rapidly than some others because of limitations on raw materials inputs, hence the coefficient is somewhat smaller and not significantly different from zero when rate of growth (CCE) is the dependent variable.

Initial employment is a significant determinant of the present size of firm, measured either in terms of employment or assets, although the absolute size of the coefficients is fairly small. It is interesting to note, however, that initial size is not significantly related to either rate of growth of the index of success (EVAL) which reflects both growth and profitability.

Firms which had been innovational were larger, had grown faster, and were more profitable than others, in conformity with prediction. In all cases, the coefficients were positive, relatively large, and in almost all cases statistically significant. However, one cannot jump directly to the conclusion that returns to innovation are high since we have data only on innovators who were successful. The incidence of innovational failure cannot be estimated from the data at hand.

One of the crucial tests of the theory outlined earlier involves the
importance of psychological or sociological variables as reflected in ethnicity. In earlier regressions, groups of dummy variables for the five ethnic groups for which I had data (see Table 1.6 for numbers of Yoruba, Ibo, Edo, Ibibio, and Hausa—the dummy for Yoruba was omitted in each case) were included. There was a serious problem of multicollinearity between Edo and rubber processing, and the coefficients of variables other than Ibo were never significant. Hence, in this group of regressions I adopted a different specification, including only the dummy variable for Ibo. In the non-Lagos regressions its coefficient was positive, fairly large, and statistically significant in almost all cases, suggesting that Ibo entrepreneurs were more successful than others. This is exactly what the existing psychological and ethnological data would predict.19

However, there is an identification problem. All but two of the forty Ibo entrepreneurs in this group had their businesses in the Eastern Region. Hence we cannot differentiate between the hypothesis that Ibos are more successful entrepreneurs and the alternative hypothesis that economic opportunities were more attractive in the East. The Lagos data provide a better test, since there the structure of opportunities (except for any form of discrimination) is identical; there we see that the coefficients of the Ibo variable are much smaller (except for growth) and not statistically significant although they are still positive in all cases. The high coefficient for growth of employment requires explanation, since it is at variance with the rest of the findings. One plausible hypothesis is that in Lagos there is particularly strong pressure for Ibo entrepreneurs to provide employment for relatives as an element of social (or family) obligation. Thus, increases in employment would reflect increasing levels of
"transfer payments" to relatives more than increase in the "real" size of
firm. But this still reflects relatively high profits.

Other variables which might be expected to influence psychological
attitudes of entrepreneurs such as father's income, status, or education
were not significant in any of the regressions in which they were included.
Certainly, the hypotheses that ethnicity or family background affect at-
titudes towards entrepreneurship cannot be rejected, but neither do these
findings lend strong support to them. The confounding of ethnicity and
opportunities must be considered and, furthermore, if the psychological
effects are those of conditioning attitudes towards engaging or not engaging
in entrepreneurial activity, one might expect little significant variation
within a group of individuals, all of whom had engaged in such activity.

The next group of variables (OEDD, AGE, SCLR) reflect various kinds
of experience or skill which should affect the ability of an individual to
perform successfully as an entrepreneur. The evidence with respect to
these variables is ambiguous.

Several forms of the education variable were tried since there is no
obvious a priori specification. Years of formal education, logarithmic
and exponential functions of years of schooling, various orderings of levels
of academic achievement (none, some primary, primary completed, some secon-
dary, secondary completed, post-secondary, etc.), and a dummy variable equal
to one if the entrepreneur had completed six or more years of formal schooling
were tried. The results were not sensitive to the specification of this
variable—the dummy variable form is used in the reported regressions.²⁰
The coefficients of the education variable, however, are rather puzzling.
In the non-Lagos observations, they are statistically significant only in
two cases in which the sign is negative and all positive values are both small and not significant. There is a change of sign between natural number and logarithmic specifications of the size of firm variables (employment or assets), suggesting that a few very large firms in which the entrepreneur had less than six years of formal education give rise to the negative coefficient.

What are we to make of this curious result? Does it mean that resources devoted to education are being wasted in Nigeria? It is far from clear that there should be a very strong relationship between small-scale entrepreneurial performance and formal education. Undoubtedly literacy can be useful, but successful entrepreneurs are in a position to hire clerks who can read and interpret written material to them. Arithmetic ability is useful to an entrepreneur, but many illiterate traders seem able to carry fairly elaborate arrays of numbers in their heads. In fact, much of what passes as formal schooling may even be detrimental, since there is excessive emphasis on rote learning—creative ability tends to be squelched. I would not want to push this argument too far since as businesses become of larger scale and of greater technical complexity, skills which are normally acquired through formal education will become important to entrepreneurs. I have argued elsewhere that two other factors are important in explaining this phenomenon. First, other kinds of education (apprenticeships, on-the-job training, self-improvement courses carried out through correspondence, and learning by doing) are important substitutes for, and in technical areas far superior to, formal schooling. Secondly, a compensatory mechanism is probably operative. Formal schooling is required for advancement in the high-paying and secure civil service. Several of the most successful entrepreneurs stated that they were deterred from entering, or advancing in, the
civil service because of their lack of formal qualifications, and they indicated a strong motivation to prove to all that they could succeed in spite of this handicap. It is also possible that in this sample, formal education and basic ability are inversely correlated. This would occur if, at higher levels of education, good students were offered permanent jobs, leaving only the bottom of the class to enter entrepreneurial careers while bright and energetic individuals, denied an opportunity for further schooling, turn to business as the best available alternative.

Interesting differences appear between Lagos and the rest of the country with respect to the importance of three other variables that reflect other kinds of occupational experience. There is evidence that large-scale entrepreneurs in other developing economies come predominantly from trading backgrounds, while the earlier industrialists come from backgrounds in craft activities and tend to remain small-scale operators. In Nigeria previous employment in clerical or government jobs seem also to be important sources of entrepreneurial talent, although the majority of industrial entrepreneurs come from craft backgrounds. Coefficients of the dummy variables for trading or clerical and government experience (STED and SCLR) are positive; the coefficients for trading experience are higher and more often significant than those for clerical experience when the dependent variable is number of employees—the relative magnitudes of the coefficients are reversed when the natural log of number of employees is substituted as the dependent variable, suggesting that former traders control a sizeable number of the very largest firms. But both backgrounds account for larger than average firms.

In Lagos, former traders control smaller and less successful than average firms, while entrepreneurs with experience in clerical or government
work are well ahead of the rest. The obvious explanation is that the requirements for success are different in Lagos (the Federal Capital) since government contracts and favors loom much more important.

This is also borne out by observing similar differences in the coefficients of the dummy variable reflecting political involvement (POL) which are positive, large, and significant in Lagos, and negative or not significantly positive outside of Lagos. It also may well be that part of the effect attributable to clerical experience is actually accounted for by the education of such individuals, although the simple correlation coefficient between the two variables is only .09.

The other variable which should reflect experience is the age at which the entrepreneur founded his business (AITB). It would appear reasonable to expect that individuals starting businesses at later ages would have had more years of relevant experience in other activities, hence the sign of the coefficient should be positive. Most of these coefficients for the non-Lagos firms are positive, and some reach the .05 level of statistical significance, while in Lagos most of them are negative. In either case, the absolute magnitudes are relatively small. Again, it may be that in Lagos political connections are more important than specific experience or that the experience gained is not relevant to entrepreneurial success.

The final three independent variables reflect ability to gain command over resources. Initial loans (ILN) reflect the ability of an entrepreneur to obtain credit for establishing a firm, while the second variable (EXLN) reflects the ability to obtain credit for expanding an existing firm. The third variable, political involvement (POL), has already been mentioned, but suffice it to say that in the Nigerian context prior to 1966 it seems
plausible that capital, raw materials, or sales might be available on more favorable terms to an individual with political connections. 25

Both in Lagos and elsewhere the coefficients of $ILN$ are small, vary in sign, and are seldom statistically significant. Since capital markets are highly imperfect and there are practically no large personal fortunes to be drawn upon in Nigeria, one would expect a considerable advantage to be obtained by individuals with access to credit which would enable them to start firms on a larger scale. In almost all cases, even where credit was obtained, individual savings were by far the most important source of venture capital. There is widespread feeling among Nigerian entrepreneurs that the virtual absence of credit institutions willing to lend to them presents a serious obstacle to industrial development. Yet these data suggest that individuals without access to credit have done as well as (or even better than) others. This is quite consistent with observation I have made elsewhere stating that for industries of the kind represented in this sample (simple technology and low investment thresholds), capital was probably not a serious obstacle since a firm could start on a small scale and grow through reinvested profits. [26] However, the coefficients of the $EXLN$ term suggest that availability of loans for expansion purposes may have been important. This may be partly misleading. Again, the preponderant source of capital for expansion has come from reinvested profits. The role of loans may be to allow expansion at a more rapid pace than would otherwise be feasible (although the negative coefficient of this term in regression (5) and the small coefficient in regression (11) may cast doubt even on that). It is more likely that given the Nigerian institutional structure, the direction of causality is reversed. That is, firms which can demonstrate their success are more likely to
obtain loans from banks or equipment suppliers. Also, there is some tendency for loans to substitute for reinvestment, and many of the most successful (and accumulation minded) entrepreneurs professed an aversion to using credit. On the other hand, firms in shaky condition (frequently with substantial excess capacity) are the ones which most actively seek loans and complain loudest about the lack of credit facilities. We can establish statistical association but not causation!

I have previously alluded to the possible misspecification of this model in the regressions reported. Table 3 presents the results of three alternative specifications for the non-Lagos respondents. Equation (1) is the same one reported in Table 1, while Equations (13) and (14) are specified somewhat differently. In particular, Equation (14) regresses present employment on the same independent variables except innovation as (1). The degree of explanation is about the same in the two versions, although an F test indicates that the addition of innovation is statistically significant. Comparing the two equations, it is apparent that the relative importance of the independent variables is not much changed. Almost all of the coefficients become larger, suggesting that most of them are also related to innovation, but that multicollinearity between innovation and any one of them is small (no simple correlation coefficient exceeded 0.1). None of the previous interpretations is drastically affected.

A comparison between Equations (1) and (13) indicates that there is not a great deal to choose between the explanatory powers of the two relationships, although (1) is slightly better. Variables which appear in both equations are of the same sign and approximate magnitude (with the exception of AGE which is not significant in either case). However, (1) is preferable because it includes additional variables which our theory
### Table 3

**Alternative Regression Specifications—Non-Lagos Respondents**

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<td>28.1704&lt;sup&gt;d&lt;/sup&gt;</td>
<td>23.5940&lt;sup&gt;d&lt;/sup&gt;</td>
<td>---</td>
</tr>
<tr>
<td>N</td>
<td>101</td>
<td>101</td>
<td>101</td>
</tr>
<tr>
<td>R&lt;sup&gt;2&lt;/sup&gt;</td>
<td>.5298</td>
<td>.5723</td>
<td>.5515</td>
</tr>
<tr>
<td>F</td>
<td>12.9600</td>
<td>9.8160</td>
<td>9.9523</td>
</tr>
<tr>
<td>d.f.</td>
<td>8,92</td>
<td>12,188</td>
<td>11,89</td>
</tr>
</tbody>
</table>

<sup>a</sup><sub>t>1.0</sub>

<sup>b</sup><sub>t>1.3</sub>

<sup>c</sup><sub>t>1.6</sub>

<sup>d</sup><sub>t>2.0</sub>

Notes to Table 3: Same as for Table 1, except that OED is own education, scaled 1 if none, 2 if some primary, 3 if primary completed, 4 if some secondary, 5 if secondary completed, 6 if post-secondary education.
suggests should be of some importance. Special conditions in the rubber processing industry (RUBB), receipt of loans for founding the business (ILN), the degree of dispersal of entrepreneurial effort (AITB), and the effect of Ibo ethnicity (IBO) are accounted for. The form of the education variable is different in the two equations but has negative sign in both, and the difference in magnitude merely reflects the different scaling of the variable (other regressions indicate little difference between the two formulations). Controlling for the specific conditions in the rubber industry and of Ibo ethnicity accounts for the lowering of the coefficients of clerical and trading occupational experience and of innovation.

VI.

In this paper I have attempted to provide a framework for thinking about entrepreneurship and economic development in a more systematic manner than has been common. In particular, the theoretical apparatus provides an explicit way of considering the interplay between psychological, social, and economic variables and avoids resorting to a single-factor explanation. In addition, non-homogeneity of projects and imperfect information are accommodated. While few, if any, of the implications of this model will come as a surprise to anyone who has thought about the problem in more conventional economic terms, these results can only be obtained from the usual theory of the firm by making many intuitively plausible but ad hoc and non-rigorous modifications.

Also an attempt has been made to test some implications of the model with Nigerian data by use of ordinary least squares regression analysis. While none of the R²'s are particularly high (ranging from .13 to .57), they
do represent statistically significant degrees of explanation. Given the necessarily crude measures of entrepreneurial performance and of the various socio-economic independent variables, these results are rather encouraging.

Indeed, in such cross section data one would hardly expect a high degree of explanation. [36] Much of the literature on entrepreneurship has emphasized the importance of psychological variables which shape the attitude of individuals towards undertaking entrepreneurial activity. We could hope to capture these effects only insomuch as they were systematically influenced—ethnicity or father's position in society—ethnicity is confounded with regional variations in the structure of opportunities, and the various measures of father's position are never statistically significant. Furthermore, it may well be that the appropriate comparison is between entrepreneurial and non-entrepreneurial groups, while our data "allow comparison only between entrepreneurs varying in degree of success." Certainly entrepreneurial performance depends on individual differences that cannot possibly be accounted for in toto by a few imperfectly measured socio-economic variables.

However, willingness to engage in entrepreneurial activity is not enough—there must also be an ability to respond to opportunities, and this is influenced by specific kinds of experience and institutions which enable individuals to gain command over resources. This analysis is somewhat more successful in illuminating such factors.

Alternative specifications of the regression model provide some insight into the nature of the relationships. Fortunately, the coefficient estimates are rather robust, suggesting that the conclusions drawn are quite insensitive to errors of specification.
Two lines of further research effort are indicated. First, it would be extremely useful to have appropriately matched control groups of entrepreneurial and non-entrepreneurial individuals in order to test important hypotheses regarding motivational factors and secondly, the regression model should be extended to take account of specific interaction terms.
Appendix I

The tables in this appendix show the composition of the sample of firms included in the analysis of Sections VIII and IX.

Table I.1

<table>
<thead>
<tr>
<th>Industry</th>
<th>No. Interviewed by Harris</th>
<th>No. Interviewed by Rowe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawmilling</td>
<td>36</td>
<td>29</td>
<td>65</td>
</tr>
<tr>
<td>Furniture</td>
<td>16</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>Rubber Processing</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Printing</td>
<td>16</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>Garment Making</td>
<td>6</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>All other industries</td>
<td>17</td>
<td>65</td>
<td>82</td>
</tr>
<tr>
<td>Totals</td>
<td>101</td>
<td>168</td>
<td>269</td>
</tr>
</tbody>
</table>
Table I.2

Distribution by Number of Employees of Firms Interviewed

<table>
<thead>
<tr>
<th>Number of Employees</th>
<th>No. Interviewed by Harris</th>
<th>No. Interviewed by Rowe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 or less</td>
<td>5</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>10-15</td>
<td>11</td>
<td>39</td>
<td>50</td>
</tr>
<tr>
<td>16-20</td>
<td>12</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>21-25</td>
<td>10</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>26-30</td>
<td>11</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>31-40</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>41-50</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>51-75</td>
<td>8</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>76-100</td>
<td>11</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>101-200</td>
<td>7</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>201-300</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>301-500</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>more than 500</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Totals</td>
<td>101</td>
<td>165*</td>
<td>266*</td>
</tr>
</tbody>
</table>

*Data were not available from three firms.
Table I.3

Distribution by Value of Assets of Firms Interviewed

<table>
<thead>
<tr>
<th>Value of Assets (₦ Nigeria)</th>
<th>No. Interviewed by Harris</th>
<th>No. Interviewed by Rowe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than ₦100</td>
<td>3</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>₦1001-5000</td>
<td>17</td>
<td>69</td>
<td>86</td>
</tr>
<tr>
<td>₦5001-10,000</td>
<td>24</td>
<td>26</td>
<td>50</td>
</tr>
<tr>
<td>₦10,001-20,000</td>
<td>18</td>
<td>23</td>
<td>41</td>
</tr>
<tr>
<td>₦20,001-50,000</td>
<td>25</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>₦50,001-100,000</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>more than ₦100,000</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Totals</td>
<td>101</td>
<td>164*</td>
<td>265*</td>
</tr>
</tbody>
</table>

*Data were not available from four firms.

Table I.4

Distribution by Type of Organization of Firms Interviewed

<table>
<thead>
<tr>
<th>Type of Organization</th>
<th>No. Interviewed by Harris</th>
<th>No. Interviewed by Rowe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietorship</td>
<td>41</td>
<td>95</td>
<td>135</td>
</tr>
<tr>
<td>Partnership</td>
<td>14</td>
<td>43</td>
<td>57</td>
</tr>
<tr>
<td>Private Limited Company</td>
<td>42</td>
<td>30</td>
<td>72</td>
</tr>
<tr>
<td>Public Limited Company</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Totals</td>
<td>101</td>
<td>168</td>
<td>269</td>
</tr>
</tbody>
</table>
### Table I.5
Regional Distribution of Firms Interviewed

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagos metropolitan*</td>
<td>168</td>
</tr>
<tr>
<td>West**</td>
<td>35</td>
</tr>
<tr>
<td>Mid-West</td>
<td>16</td>
</tr>
<tr>
<td>East</td>
<td>39</td>
</tr>
<tr>
<td>North</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>269</td>
</tr>
</tbody>
</table>

*includes some parts of the Western region

**not including those parts in the Lagos metropolitan area

### Table I.6
Distribution of Entrepreneurs Interviewed According to Ethnic Group (Tribe)

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoruba</td>
<td>172</td>
</tr>
<tr>
<td>Ibo</td>
<td>58</td>
</tr>
<tr>
<td>Edo</td>
<td>24</td>
</tr>
<tr>
<td>Ibibio, Efok, and Ijaw</td>
<td>5</td>
</tr>
<tr>
<td>Hausa</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>269</td>
</tr>
</tbody>
</table>
Footnotes

* Associate Professor of Economics, Massachusetts Institute of Technology. This research has been supported at various points by the SSRC/ACLS Foreign Area Fellowship Program, The Northwestern University Council for Intersocietal Research, the Nigerian Institute of Social and Economic Research, The Alfred P. Sloan School of Management Computation Facility at M.I.T., and the Rockefeller Foundation.

I have benefited greatly from the comments and suggestions on earlier drafts by George Dalton, Matthew Edel, Everett Hagen, J. R. T. Hughes, David Miller, and Frank Mitchell. Jerome Rothenberg suggested the particular theoretical approach for which I am extremely grateful, and Mary Rowe collaborated in collection of data in Nigeria.

However, my greatest intellectual and personal debt is to Harold F. Williamson, Sr., who first suggested this topic, encouraged me to follow it, and supervised the dissertation that resulted. He has been an inexhaustible source of new ideas, wise counsel, patient understanding, and moral support. Such a debt can never be repaid--its acknowledgment is inadequate to convey the gratitude that is felt.

Parts III-V of this paper are based heavily on an earlier paper [25], and Part I is based on a portion of Chapter II of [24].

1. The literature is extensive, but the main lines of approach can be found in Cole [15], Knight [30], and Schumpeter [46]. Other important works include [16], [19], [20], [31], [33], and [44].

2. See the typologies proposed by Danhof quoted by Brozen [8], Cole [15], Alexander [2], and Hughes [28].
3. This definition follows closely that of Harbison's "organization" [23] or Hirschman's "ability to make development decisions" [27].

4. Greenhut [21] argues that profits are a functional, not a residual, return to entrepreneurship. However, he attributes all differential returns to decision makers as reflecting differential skills. To a large extent this is true, but he seems to go too far.

5. If a single authority or decision-making unit undertakes all investment in the economy, there is no problem. In that case, outlined by Chenery [13], "The related decision rule is to rank projects by their SMP [Social Marginal Product] and go down the list until the funds to be allocated are exhausted. Alternatively, any project having an SMP above a given level can be approved."

6. I am indebted to Jerome Rothenberg for suggesting this approach.

7. Note that projects which involve producing a given output at lower cost than existing methods will release factors of production. It is tacitly assumed that these factors will find alternative employment. In an economy with unemployment, adoption of such a project could lead to lower output through income effects. \( \Delta Y_j \) is defined as the incremental output associated with the exploitation of the jth project. There is no reason why \( \Delta Y_j \) cannot be negative.

Also note that only new projects (including expansion of existing production units) are being considered in this model. Thus the sum of the \( \Delta Y_j \)'s is the change in output arising from the exploitation of new projects.

8. This approach is similar to that employed by Lancaster [32] in describing the choice set of a consumer.
9. This follows recent works on the managerial firm, e.g. Marris [37] and Williamson [47], which postulate a utility function for the firm.

10. This notation and argument follows Pearce [43].

11. A similar approach is taken by Mortenson [39] in explaining unemployment duration. He shows that in a world where information is incomplete and can be obtained only at a cost (by searching), a rational individual will select a cut-off wage such that any offer below this level is rejected (any offer above this level is accepted) and the cut-off point is revised in light of further information.

12. "For one, the actor [entrepreneur] does not really know all the alternatives: he must find them out, and for this purpose, a period of search is necessary. Secondly, the actor does not know all the consequences, and has neither the time nor the skill to figure them out." P. Lazarsfield, quoted by McClelland [38], p. 237.

13. Two papers by Campbell, [11] [12], provide particularly interesting treatments of perception in a cross-cultural context.

The need for identifying individuals' subjective probabilities is mentioned by Arrow [3]. However, this is necessary only if we are concerned with the choice itself, distinct from the consequences of the choice for the economy according to Georgescu-Roegen [18]. By concentrating on the probability of a project being exploited within the economy rather than on the probability of a particular decision unit's exploiting a project, our neglect of the perception problem is justified.

14. See [41].
15. See [1].

16. See [42].

17. The principal problem encountered was an absence of information concerning the universe of indigenously owned manufacturing establishments. Although an industrial directory had been prepared for the Ministry of Commerce and Industry, it was incomplete, inaccurate, and nationality of ownership of firms was not indicated. Hence, it seemed reasonable to concentrate on specific industries which were known to have a high degree of Nigerian participation, wide geographical distribution, and a range of firm sizes. One could easily gain information about the existence of competitive firms from respondents, thereby giving quite accurate coverage of those industries.

18. Footwear and baking were the only major industries omitted which satisfied the above criteria for inclusion. These were deliberately excluded because comprehensive industry studies, P. Kilby, [29], and E. W. Nafziger, [40], had been recently undertaken and their results were available.

19. The relevant ethnological literature is reviewed and hypotheses regarding n-achievement levels tested by LeVine [34].

20. See Table 3 for an alternative specification of the education variable.

21. Harris, [24], Chapter IX. See also A. Callaway, [9], [10], discussions of non-formal education. S. Bowles [5] presents estimates of returns to education in Northern Nigeria which are positive and quite high.

22. See T. Geiger and W. Armstrong, [17], Chapter II and Appendix I.
23. See A. Alexander, for a good review of this literature [2].

24. Two rather different specifications are plausible. One is to keep the entire set of dummy variables relating to a single conceptual variable (e.g. prior occupation) and to test the significance of the entire set by means of an F test, not paying attention to the significance of any single dummy variable alone. However, problems of artificial multicollinearity arise from including large numbers of dummy variables in regression. C. Lin, [35], suggested an alternative approach which would compress the dummy variables into a single vector for each effect, allowing estimation of both a constant and complete sets of effects for each underlying variable. Unfortunately, problems arose with the procedure and it had to be abandoned. The alternative specification adopted in the regressions reported in this paper is only to include those particular dummy variables which are "important" in the sense that they are significantly dissimilar to the other dummy variables in the group (e.g. rubber processing is quite different from all of the other industries which show less variation among themselves).

References


