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9. ABSTRACT

The results of a study designed to (1) describe accurately what happened in Puerto Rico's farming and food distribution system from 1950 to 1965; (2) investigate and explain the process by which change occurred in the Puerto Rican food distribution system; (3) understand better the variables correlated with innovativeness; and (4) generalize the findings applicable to other developing nations. Sections of the report discuss in detail the prevailing conditions in the Puerto Rican economy, agricultural development, political factors, responsibilities of the various government agencies, government influences on changes in food retailing, measurement and evaluation of the changes in food retailing, results in agriculture, innovative behavior by retailers and farmers, and development policy implications of the Puerto Rican experience. The authors conclude that the Puerto Rican experience shows that the fear of unemployment as a result of commercial reforms can be and probably most always is a straw man. As more efficient operators emerged in Puerto Rico, total employment in retail food distribution actually increased. Puerto Rico accomplished a thorough-going reform in distribution with almost no political opposition, mainly because of the way the government approached the subject. First, the top political leader indicated his concern with the problem of high prices. Competent technicians were asked to make a detailed study of the situation and make public their findings. Following this, the top political leader appointed a commission of interested parties to study the technicians' recommendations. Finally, the government began a system of planned reform, acting upon the commission's recommendations.

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MARKETING—
ONE ANSWER TO POVERTY

Food Marketing and
Economic Development
in Puerto Rico, 1950-65

By
JOHN R. WISH and KELLY M. HARRISON

College of Business Administration
in cooperation with
Center for International Business Studies
Eugene, Oregon
1969

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FOREWORD

The data for this work came out of two research projects sponsored by the United States Agency for International Development. The co-directors of the first study, the Latin American Food Marketing Study, of which this book is a part, were Dr. Charles C. Slater, Professor of Marketing; Dr. Harold M. Riley, Professor of Agricultural Economics; and Dr. R. Vincent Farace, Associate Professor of Communication—all of Michigan State University. Dr. James Shaffer of Agricultural Economics and Dr. Herman Koenig of Electrical Engineering served as consultants. The second research project was the Latin American Market Planning Center under the direction of Dr. Charles C. Slater.

The first phase of the Latin American Food Marketing Study took place from June 1965 through June 1966 in Puerto Rico. An interdisciplinary team of researchers from Michigan State University, the University of Puerto Rico, and the Puerto Rican Department of Commerce participated in that effort. Dr. Harrison and Dr. Wish were with the project from its inception.

One of the strengths of this interagency project was that it combined the talents of continentals and Puerto Ricans. Two Puerto Rican Department of Commerce employees, Jose Santaigo and Idalia Rodriguez, were assigned to the project full time, and the latter was engaged at the time in research for her master's thesis. In addition, three Puerto Rican graduate students worked part-time on the project and intended writing their theses as a part of the research. The general topics of the theses written by others are:

José Gonzalez Casillas, "The Marketing of Selected Starchy Vegetables in Puerto Rico" (M.S. candidate, Department of Economics, College of Agriculture at Mayaguez, Puerto Rico).
Luis Davis, "La Diferencia en Márgines de Precios de una Seleccion de productos agricolas" (M.S. candidate, Department of Economics, University of Puerto Rico).
Idalia Rodriguez, "An Analysis of Changes in Consumer Demand for Food and Food Shopping Habits, Puerto Rico, 1940-64" (M.S. candidate, Department of Economics, University of Puerto Rico).
Perfecto Santana, "Analysis Comparativo de los Cargos de Transportación y la Estructura Geografica de Precios para un Grupo Seleccionado de Productos Alimenticios en Puerto Rico, 1950-65" (M.S. candidate, Department of Economics, University of Puerto Rico).

The first public airing of some of the project views was given by Dr. Charles C. Slater at the American Marketing Association meetings in September 1965. Then, in June 1966, a three-day conference was held in San Juan to discuss preliminary findings with local businessmen, government officials, representatives of the United States Agency for International Development, and officials of certain Latin American governments. A limited number of summaries have been published.[1]

Presently, Dr. Kelly Harrison is directing a research project for Michigan State University in Cali, Colombia. Dr. Wish is an associate professor of marketing at the University of Oregon.

[1] Robert W. Nason (ed.), *The Role of Food Marketing in the Economic Development of Puerto Rico.* Summary of the seminar held June 8-11, 1966, San Juan, Puerto Rico.

ACKNOWLEDGMENTS

The research for this book was done while the authors were employed as research assistants in the Department of Marketing and the Latin American Studies Center of Michigan State University, under a project contract between Michigan State University and the U.S. Agency for International Development. Many of the ideas and concepts developed herein can be attributed to the co-directors of that research project: Dr. Charles C. Slater, Dr. Harold M. Riley, and Dr. R. Vincent Farace. The continual exchange of ideas that took place between the co-directors and other faculty members, such as Dr. James D. Shaffer and Dr. Herman Koenig of Michigan State University, and José Santiago and Idalia Rodriguez of the Department of Commerce, Commonwealth of Puerto Rico, was of great advantage to the authors.

Throughout the development of this book, which is a result of the research conducted for their Ph.D. theses, the authors were privileged to have the constant interest, encouragement, and guidance of the members of their respective thesis committees. Dr. Kelly Harrison expresses his deepest appreciation to the chairman of his committee, Dr. Harold M. Riley, for his probing criticisms and pertinent comments appropriately blended with remarks of encouragement and optimism. The other members on Dr. Harrison's thesis committee, Drs. Charles C. Slater and James D. Shaffer, provided valuable guidance, especially during the difficult stages of research design and final analysis. Their comments and criticisms of earlier drafts helped to improve the analysis and clarify the author's presentation. Dr. John Wish is also especially grateful to the members of his committee. Drs. Slater and Riley were

on the scene in Puerto Rico for over six of the twelve months of field work, and the other thesis committee members gave freely of their time from distant locations. Dr. Everett Rogers of the Department of Communication took time from his own research efforts to help, read, and constructively criticize. Dr. Donald Taylor of the Department of Marketing was able to comment in detail and suggest better organization even though he was working both in Recife, Brazil, and at the Michigan State University campus. The comments and criticisms from each of the committee members helped improve the analysis and clarify the final presentation of the dissertation.

The authors also wish to acknowledge the assistance provided by Dr. Vincent Farace and his graduate assistant, David Lindley, of the Department of Communication, who gave special help in planning and carrying out the statistical analysis and executing the data processing. Extensive help was also given by Dr. Garland Wood, of the Latin American Study Center, and Miss Pat Moyer.

There were others who contributed as much. In Puerto Rico, there was the assistance of more than 100 food retailers who were willing to be interviewed. There were the many conversations with William P. Roach, the head buyer of Grand Union Supermarkets, and Modesto Ortiz, the general manager of the Cooperative Federation. Harold Toppel, George Toppel, Milton Toppel, and Max Seplowin of Pueblo Supermarkets were also most helpful in providing background material. Lee Slusher, of Bargain Town Supermarkets and a newcomer to Puerto Rico, provided the view of a recently arrived entrepreneur.

In Puerto Rican government offices, there was always a willing sense of cooperation. Don Lemons, consultant in the Department of Commerce and formerly a director of Fomento's food marketing program, was especially helpful because of his first-hand knowledge of the government and private industry programs. The Agricultural Experiment Station loaned the use of its IBM facilities as well as gave us access to the economists who were most intimately concerned with the improvements of food marketing. The Agricultural Extension Service gave us access to their files, information, and knowledge. Here, Mrs. Judith Frias was especially helpful.

At the University of Puerto Rico campus, our main contact was the Social Science Research Center. The director, Dr. Rafael de Jesus-Toro, was helpful and encouraging in all of our work. His administrative assistant, Miss Carmen H. Lopez, was of particularly great help in retrieving memorandums from the Galbraith and Holton study.

The authors are especially indebted to their wives, Mary Ann and Loy, without whose encouragement and patience this book would not have been possible.

CONTENTS

INTRODUCTION

From 1950 to 1965, Puerto Rico had one of the fastest growing incomes in the world. During the last ten years of that same period, the food distribution system was transformed from one consisting of numerous small shops and the central markets common throughout Latin America and much of the rest of the world, to one with the outward appearance of the United States' system of large supermarkets. In sharp contrast to experiences in other parts of the world, the growth in income was accomplished without a "food drain." There were no food shortages, nor did food prices rise more rapidly than wages; and the transformation of the food distribution system took place without the intense political problems that accompanied similar transformations in the United States in the thirties, England in the fifties, and Chile in the sixties.

In June, 1965, an interdisciplinary team of researchers, including the authors, from Michigan State University, began the first phase of a two and one-half year study to evaluate first in Puerto Rico and then in Northeast Brazil and LaPaz, Bolivia, the validity of Rostow's national market concept, and to determine the role that food marketing plays in economic growth. A review of works by other social scientists and direct observations in Puerto Rico suggested the hypothesis that atomistic and imperfectly competitive markets in developing economies are generally accompanied by high risks, primitive production methods, and ineffective transmission of consumer demand.

The study was financed by the United States Agency for International Development. The specific goals of the research were: (1) to

describe accurately what happened in Puerto Rico's farming and food distribution system from 1950 to 1965; (2) to investigate and explain the process by which change occurred in the Puerto Rican food distribution system; (3) to understand better the variables correlated with innovativeness; and (4) to generalize the findings of the other developing nations.

Three different approaches were used. First, an historical description of food marketing changes and the political and social factors behind them was compiled from secondary sources. Second, a picture of the economics of change was drawn from survey data of 1950 and 1965, from censuses of business and agriculture for the period 1949 through 1963, and from informal interviews. Finally, social-psychological survey data were used to identify the characteristics which encourage innovativeness and to understand those people who brought about the changes.

In the first seven chapters of this monograph, the authors present some of the theoretical underpinnings of the general importance of distribution and describe the specific changes in food distribution made in Puerto Rico from 1950 to 1965 and the people who brought about those changes. The final chapter forms conclusions from this particular study into general and specific policy goals for economic development.

I. PUERTO RICO'S ECONOMY

Prior to World War II, economists by and large emphasized industrial expansion as the key to induced economic growth. After World War II, however, several development economists suggested that the agricultural sector should be developed first, then the industrial sector. During the past decade, economists have settled on a doctrine of balanced growth between rural and urban areas. (Witt, 1965) But while development economists now generally agree that productivity gains are important in both the industrial sector and the agricultural sector, few have seriously considered the role of *distribution,* or *exchange,* in the development process. Economists have stressed the primacy of increasing industrial and agricultural productivity to the neglect of the intangible but critically important coordinating functions of the marketing system.

Walter W. Rostow has been a notable exception. Rostow suggests that the marketing system may be a critical factor in the "balanced" growth of rural and urban sectors in a developing country. He points out that many developing nations have, in fact, progressed beyond the development stage which is characterized by a build-up in social capital. Many are now at a point where significant inherent distortions exist which hinder economic growth. These structural distortions are mirrored by the following conditions: (1) there is some industrial capacity, usually developed to substitute for the import of certain kinds of consumer goods; (2) the market for most of these manufactured goods is narrow (textiles being an exception); (3) although some agricultural development is taking place, the gap between rural and

urban life is widening; and (4) as a result of this imbalance, men and women are moving from the rural areas to the cities where there is insufficient industrial momentum to provide full employment. (Rostow, 1964)

Rostow maintains that the way to achieve a take-off into sustained growth for nations experiencing such conditions is "... to break down these structural distortions, to produce a self-reinforcing agricultural and industrial expansion, and to create truly national markets within these countries." (Rostow, 1964, p. 165) To Rostow, the phrase "national market" connotes an interlocking exchange of products between the urban and rural sectors within or between regions of a country. Development cannot proceed, he warns, unless the great numbers of people who are not now in the money economy (mainly rural peasants) are brought into it. For example, if 50 percent of the population has no money and no way to earn it, and if only 10 or 20 percent of the remainder can assert their demand for goods, the market is much smaller and distorted than it appears at first sight. Bringing more people into the money economy through more effective linkages between urban and rural areas is what Rostow means when he calls for the creation of the "national market."

The marketing system for either agricultural or industrial products may affect economic growth rates in several ways. (1) It can reduce risks through adequate information flows. (2) It can provide the mechanism to effectively or ineffectively coordinate the production and distribution of economic goods according to expressed needs and wants. (3) Marketing institutions can be a major source of entrepreneurial talent and capital for other sectors of the economy. (4) The marketing system can generate pecuniary and technical internal and external economies for producing firms by extending their markets. (5) The marketing system can pull subsistence producers into the exchange economy. (6) Marketing institutions can increase elasticities of supply and demand by making available new or improved products which consumers may find desirable. (7) Marketing institutions can lower consumer costs by improving distribution efficiency and reducing spoilage. (8) The marketing system can reduce transaction and exchange costs. (Moyer, 1965)

The growing concern for the rapid expansion of world population and its pressure on food supplies has been focused on the underdeveloped countries where agricultural production techniques are still basically primitive. Various population and food supply studies have indicated that many developing nations are barely holding their own in the production of food supplies for growing populations.

The critical role of food production was stressed by Lawrence W.

Witt in his Presidential Address before the American Farm Economic Association in August, 1966.

> Implicitly, everyone assumes that an agricultural revolution is needed, which draws on nonfarm produced inputs. The modern agriculture of tomorrow in developing countries requires a different size of farm, new combinations of resources, new pricing policies for agricultural inputs, different capital structures, and may well require substantial changes in the geographical distribution of farming and farm people. (Witt, p. 1089, 1966)

He concludes: "The food problems posed by the population explosion can be solved.... There will be no greater challenge in your lifetime and mine." (Witt, p. 1090, 1966)

In a recent publication, Robert D. Stevens has pointed out that developing nations may have to produce significantly larger amounts of food in order to supply the rising demand brought on by population growth and rising incomes. He uses an equation developed by Ohkawa to demonstrate the relationship: D=p+gn, where D=growth in food consumption, p=rate of growth in population, g=rate of growth in per capita income, and n=the elasticity of demand for food associated with changes in income. (Stevens, 1965)

Food needs are determined by the rate of population growth, which is fairly high in most Latin American countries(Stevens uses 2 percent as a representative figure for all developing nations), plus an additional increase in food consumption brought on by rising incomes, which is determined by income elasticity in the country. Higher per capita incomes are certainly a goal in all Latin American countries. If we assume a 2 percent rate of population growth, a 2 percent growth in per capita income, and an increase elasticity of .7, food consumption increases at a rate of 3.4 percent per year. A population increase of 3 percent per year coupled with a growth in per capita income of 4 percent and an income elasticity of .7 would yield a yearly increase in food consumption of 5.8 percent.

This suggests that three factors altering consumer demands for food products are at work in developing nations. The first and perhaps most important in its impact is a rapidly rising population. The second is rising per capita incomes. And the third, and perhaps least obvious, is the change in products and services required to fulfill changing consumer demands brought on by the first two factors mentioned above. The impact of these factors is focused first on the food distribution sector and then on the food production sector. Stevens points out that if either or both are unable to adjust adequately to changing consumer demands, rising food prices may create dangerously inflationary pressures in the developing nation.

Thus, food production increases are necessary if inflationary pressures are to be avoided. But it is also important that the marketing system be effectively organized and coordinated to insure that the food production is distributed efficiently. The structure and performance of the marketing system may significantly affect food prices, first through the addition of marketing costs and second through its effect on the willingness of producers to increase investments of labor and capital in expanding food production.

Economist Lauchlin Currie has suggested that developing nations, under the influence of economic development theorists, have placed too much emphasis on GNP growth rates, production, and investment. As a result, consumption has lost its place as the goal of production. He, therefore, suggests a development plan which would place primary emphasis on increased consumption, particularly for the low-income underemployed. He stresses the value of economic theory in his plan and is convinced that the Keynesian analysis of the lack of effective demand is useful. Basically, he argues that economic efficiency considerations and traditional development theory are necessary but are not sufficient to break through the vicious circle of poverty in developing nations. The approach must also include considerations in income distribution, or as he prefers, "relative consumption gains arising from income redistribution." (Currie, 1966, p. 20)

Currie advises countries interested in economic development to reformulate their development objectives, taking into consideration the importance of income distribution as well as aggregate gross income. He defines his objective as:

> . . . a program designed to assure the elements of a minimum tolerable standard of living for, say, the poorer half of the population in terms of the basic necessities of food, clothing, housing, health, primary education, miscellaneous goods, and amusements. (Currie, 1966, p. 20)

He argues that most Latin American nations exemplify the type of stagnation analysis that was applicable to Western Europe and the United States in the thirties—the Keynesian analysis of lack of effective demand and unused capacity. He terms the great increase in output in World War II, when all resources were bent toward common goals, "a revelation." With little or no immediate increase in capital, output increased in the United States from $186 billion in 1938 to over $320 billion in 1944. The increase in output came from more intensive use of existing facilities and labor.

In addition, Currie argues that the experience of European recovery after World War II offers useful lessons for developing nations in terms of more intensive use of resources. And he is concerned about

the lack of effective demand and the distribution of income, mainly in the cities. He argues that if the level of living for the poorest people in the cities is improved, greater numbers will be better off. He determines that the birth rates of city dwellers appear to be lower than birth rates of the rural population and agrees with many other observers that there is a population surplus in the rural areas. He makes a further point, though, that one way to slow down the population explosion is to get more people out of the rural areas and into the city. When this happens, he implies, the people left in the rural areas will be better off.

Currie contends that in developing nations agricultural incomes are too low and there is unfair competition between the mechanized, efficient farmer and the marginal subsistence farmer. He adds that once the elements of agricultural technology have been mastered and there are no support prices or dumping, the growth of agricultural output will depend upon the growth of effective demand, regardless of the resources poured into agriculture.

Prevailing Conditions in Developing Regions

A review of current economic data and research studies on developing nations suggests that underdevelopment is characterized by several common conditions.

Atomistic competition is present in most aspects of commodity production and marketing in developing nations. On the other hand, ownership is frequently concentrated in the hands of relatively few citizens. In some cases, large land holdings create a feudalistic economic structure. A heavy concentration of capital holdings by a few wealthy families is also a common occurrence. Nevertheless, the domestic food production and distribution sectors are usually made up of large numbers of business units competing atomistically.

Low per capita incomes are a characteristic of all developing regions by definition. In fact, the most frequently expressed goal of economic growth is to increase per capita incomes. Then too, the income distribution of households is usually extremely skewed. The percent of total income held by the lowest income families is very small.

Low nutritional levels in the face of rapid population growth and low levels of food production are a reality in today's developing nations. In many cases malnutrition and starvation already exist on a wide scale while in other nations the reality of food shortages is masked by nutritionally deficient but quantitatively sufficient diets.

Low absolute levels of labor productivity are evident in virtually all underdeveloped nations. Some economists argue that the marginal productivity of some workers is zero, especially in the agriculture and trade

sectors. If such is the case, those workers could be withdrawn from their jobs without affecting total output. The issue of zero marginal productivity is currently unsettled, but most economists agree that low labor productivity is a widespread condition in underdeveloped nations.

Underemployment of economic resources in all factors of production including land, labor, capital, and management is a frequently cited condition in developing nations. The argument states that for a variety of reasons, entrepreneurs do not utilize an optimum combination of resources in the production of goods and services; i.e., existing factors of production could be re-allocated to increase total output. Schultz (1964) and Welsch (1964) have argued (on the basis of research in various aspects of traditional agriculture in four different countries) that there is relatively little or no inefficiency in the allocation of available resources. They claim that low productivity is caused by a lack of availability and use of more productive techniques. However, these studies were only meant to examine resource allocation within the agricultural sector. They did not consider the possibility of total resource allocation in the economy. The possibility still exists that certain resources (capital) should be transferred into agriculture with labor being removed to other, more productive uses.

Capital deficiencies are regarded by most economists as the single most critical problem in the underdeveloped world. Adam Smith stresses the importance of saving for investment in improved production techniques. The emphasis on capital has continued through current writings on development economics. The reality of existing capital shortages in developing nations coupled with the existence of atomistic competition suggests that capital formation in the private sector is inhibited by a low level of equity capital prevailing in business units and the resultant low absolute returns to each individual firm. Capital accumulation for investment in productive innovations is difficult for such business units because of the need to use a high percentage of the low absolute returns for family survival. For the typical businessman, capital savings for a specific investment is slow and seemingly hopeless.

Unused productive capacity is frequently a problem in spite of the previously mentioned shortage of equity capital in developing nations. Productive capacity is unused because of a basic misallocation of resources. Hence, if an inordinate amount of capital has been allocated to the production of a given commodity (relative to other industries), then the capital equipment will not be used to its capacity since consumer demand will not be sufficient. A preoccupation with large capital-intensive industrial development projects has often resulted in a poor allocation of productive resources in the light of effective consumer demand.

Low literacy levels are a common characteristic of developing nations. There are a few exceptions, like Argentina; but generally illiteracy is a major problem in underdeveloped nations. Consequently, educational improvement is usually a major thrust in development programs.

Weakness of Classical Economic Theory in Policy Reformulation for Developing Economies

As a result of a combination of these factors, individuals within developing nations are frequently trapped in a vicious circle of poverty, inefficiency, and low achievement motivation. The dilemma appears to hinge not on a lack of individual desire for productivity improvements, but on a belief that such changes are unrealistic and hopeless given the small scale of business units, the large number of competitive units, low income, and low knowledge levels. Research studies in Guatemala (Tax, 1963), Southern Italy (Banfield, 1958), Fiji and New Guinea, as well as the study of Puerto Rico reported in this monograph, have affirmed that strong atomistic competition may act as an impediment to productivity gains rather than as a stimulus as is generally assumed in economic theory.

Perhaps this tentative conclusion implies that the traditional policy norms relating pure competition and "efficient" resource allocation should be re-examined to determine their application to developing nations. While the economists can show in the textbook example of the static model that under conditions of perfect pure competition, resources will be allocated optimally, the point is irrelevant for developing nations because they are more interested in dynamic changes which bring about increased per capita income and more equitable distribution of that income. The field evidence that small scale atomistic competition dampens initiative and inhibits productivity gains, shows that policy norms for developing nations should go beyond the static theory of perfect competition to a dynamic view of the economic process. This dynamic view of economic theory would be one where

> processes of change are seen at least in part to be irreversible, self-generative, and self-determining. . . . Thus [dynamic theory] would attempt to explain, at least in part, such things as the state of technology, the number of sellers, the evolution of buyers tastes, the nature of the market institutions . . . the attitudes of sellers . . ., etc. (Ackley, 1961, p. 260)

Progress in formulating such a theory has been extremely slow. Attempts have generally produced nothing more than a set of conditions applicable for policy guidance in a particular industry. This failure does not mean that developing nations should fall back on static economic

theory which makes no provisions for uncertainties, technological change, sequential business decisions based on information feedback, endogenous determination of crucial variables, etc. Perhaps the most realistic alternative is for developing nations to formulate dynamic performance goals. Thus, efforts would be focused on achieving gains in productivity rather than on static economic efficiency. For the marketing sector, specific policy goals might be grouped under (1) those aimed at achieving better usage of available marketing methods and resources, and (2) those aimed at encouraging the adoption of new techniques.

The appraisal of marketing performance utilizing a dynamic model affords a flexible and pragmatic approach to market policy formulation to encourage greater productivity. There are at least six different types of policy measures which might contribute to the goal of rising productivity in particular market situations; they are property rights laws, facilitative regulations, direct assistance to marketing organizations, market control programs, market planning and technical assistance, and direct government investment.

The "Invisible Hand" and the Diffusion of Technological Innovations

Given the need for technological innovation, and in view of existing conditions in developing nations, what are the critical factors inhibiting the diffusion of more productive techniques?

Thoughtful researchers have suggested a number of conditions contributing to the low utilization of innovative techniques. Some of those frequently mentioned in various combinations are: low level of education and training (Schultz, 1964), poor communications (Schramm, 1964), inadequate transportation (Kindleberger, 1958), insufficient saving (Lewis, 1954), and low achievement motivation (McClelland, 1961). Undoubtedly each of these factors, and many more, plays some role in inhibiting the diffusion of technological innovation. It is, therefore, not the purpose here to disclaim the importance of these factors or to suggest entirely new ones. Rather, the purpose is to explain within the framework of the marketing system the ways in which those factors interact to inhibit the process of innovation.

As a result of existing conditions (especially small scale atomistic competition, insufficient education and training, and inadequate communications) businessmen in developing nations find themselves trapped in a position of inability to improve productivity through technological innovations. The difficulty is not an inherent lack of desire for improving productivity, but rather a low level of individual initiative attributable to low knowledge levels, small incomes, and small or non-

existent savings, and an absence of effective economic incentives. The individual businessman is unable to see any practical way of improving his well-being through saving and investing in technological innovations.

Atomistic competition as it exists in most developing nations is a hindrance rather than a help in the development process. Specifically, atomistic competition does not automatically contribute to economic growth by encouraging productivity improvements and more effective market coordination. The atomistically competitive market price system, without effective market exchange and property rules or without some external direction and control, should not be expected to lead automatically to rising productivity and better market coordination. The needed adjustments can be fostered through competitive changes, or they can be induced by government policy.

Food Marketing in Development

Relatively little is known about how to develop improved food marketing systems in countries in the early stages of development. The proceedings of the agricultural marketing seminars sponsored by USAID in Jamaica (1959) and in Brazil (1962) are evidence of the general lack of knowledge about marketing conditions and the means for improving markets in Latin America.

> Food comes first. Only after a country has satisfied its essential food requirements, unless it has something to export, can it start producing anything but the most necessary manufactures. (Enke, 1963. p. 26, 27,)

Possibly the earliest study which could be interpreted as being concerned with the role of food marketing in economic development was the Galbraith and Holton study *Marketing Efficiency in Puerto Rico* (1954). In 1949-1950, the Puerto Rican food retailing system was "atomistic," and one in which price competition was not practiced since merchants thought their demand curve was relatively inelastic. Credit was extensive at all levels of the food distribution system. To the extent that margins could be reduced through efficiencies, the poorest consumers would not need to spend as much money on food and thus could use it to buy other consumer goods. As a result of modeling a system of food distribution, Galbraith and Holton recommended certain policy changes. Most of their recommendations were implemented over the next few years by the Puerto Rican government and private individuals.

In spite of the "success" of the Galbraith and Holton study, the social sciences have had little to say about marketing or, if you will, exchange. Perhaps this is because marketing is something so common to our experience. It is analogous to another type of study which was described by a well-known economist.

> Every branch of learning takes a good many things for granted. If these things have to be explained, "Let George do it." George is always someone in another discipline... George has always been a popular... fellow. People were inclined to rely upon him even if they did not know whether he really existed.... There has always been [in economic analysis] the basic assumption that sellers and buyers have *knowledge of the markets,* that is, of their selling and buying opportunities. The theories of supply and demand, of relative prices, interdependence, and all the rest, all have been based on the assumption that sellers know the highest prices at which they can sell and buyers know the lowest prices at which they can buy. In addition, it has always been assumed that producers have knowledge of the technology of the time, that is, of their production opportunities. (Maclup, 1962, p. 3)

Western economists have frequently ignored the exchange process in their study of economic development because of their fundamental belief in the invisible hand as an efficient allocation of economic resources. The resulting impact of inefficient resource allocation in a dynamic sense in marketing has somehow never been fully recognized.

The Role of Exchange in Society

In order to evaluate the effect of the market on economic development, it is necessary to view economic exchange as a part of the larger social setting. One of the critical factors bearing upon exchange is the prevailing type of political and social organization in a country. The nature of customs, habits, and mores are important determinants of exchange behavior. By the same token, the type of political system may vary from dictatorship to a free democracy and the economic system from communism to capitalism with considerable effect on the nature and operation of the exchange system.

There are at least three ways to organize for economic exchange in a society: (1) bargained exchange, (2) status exchange, and (3) administrative exchange. (Schmid and Shaffer, 1964) Any of the three may be utilized in combination with any form of political organization. In most societies, all three are employed at different times.

The bargained exchange system is one in which "transactions are governed primarily by a set of impersonal rules... within which exchange rates are established by bargaining processes." (Schmid and Shaffer, 1964, p. 23) In such a system, individual enterprises are permitted freedom in bargaining for exchange of commodities among themselves. This system is frequently associated with democratic political organizations but is used in practically all societies.

In the status exchange system, "transactions are governed primarily through the prescribed roles associated with social position. Exchange

rates tend to be prescribed or fixed by custom." (Schmid and Shaffer, 1964, p. 20) In this type of exchange system, social roles and customs become extremely important because they govern the exchange of economic goods. The status exchange system is frequently associated with more primitive societies though variations of the principle operate in most societies today. "To each according to his need and from each according to his ability, if voluntarily accepted by the members of society rather than being enforced by authority, would be a system of status." (Schmid and Shaffer, 1964, p. 20)

An administrative exchange system is one in which transactions are governed by those with political authority. In this case, political authority carries along with it the right to determine how resources and products should be distributed in an economy or some part of an economy. Most frequently the dictatorship, socialism, or some other form of centrally controlled political system is associated with this type of exchange system. But practically all societies have some transactions which are governed by administrative decree. This is true of so-called democratic societies as well as totalitarian societies.

Regardless of the combination of various types of exchange systems existing in a society, the efficient functioning of some kind of exchange system is necessary to allocate factors of production to alternative uses and to allocate final consumption goods in payment for those factors. The exchange system is therefore the allocating mechanism of all economic goods. The following sections will examine the role of market coordination and its relationship to both static and dynamic economic theory. The basic type of exchange system is "bargained" since this is the assumption of traditional capitalistic economic theory.

Market Coordination in a Bargained Exchange System

The bargained exchange system was defined earlier as one in which exchange is accomplished through an impersonal set of rules where a bargaining process establishes exchange rates.

In any society basic decisions must be made regarding *who* will produce *what* products and *where* and in *what form* they will be consumed. Those decisions may be made by relatively few individuals in positions of political power (administrative exchange) or by a large number of individuals (bargained and status exchange). In the bargained and status exchange systems, where large numbers of independent decisions are involved, there must be some way to coordinate and integrate the decisions if confusion and chaos are to be avoided. In the status exchange sytem, social roles, customs, and habits provide the necessary structure and coordination.

In the bargained exchange system, individual decisions to produce,

buy, or sell are coordinated for all participants by the market price system. The marketing system brings together individual buyers and sellers to provide them the opportunity to bargain and exchange commodities while seeking the greatest possible returns. If an individual finds prices for his commodities so low that they place his returns below returns available in the production of alternative commodities, he will change over to the production of other items. If enough producers follow suit, the quantity of that product available in the market will decline, and buyers will gradually bid the price up in order to fill demands. But if prices go above a certain level, consumers will make alternative purchases. In this way supply and demand determine product prices in the market place, which in turn determine the allocation of productive resources. The market, therefore, theoretically coordinates itself. Yet in a practical sense it is almost always necessary to have an outside force establish and enforce basic rules and regulations in the market in order to provide structure and minimize dishonesty among traders. The important fact is that the marketing system, through flexible prices, coordinates an immense number of independent decisions which ultimately determine how available resources will be utilized to satisfy the society's needs and wants at any point in time.

If the marketing and pricing mechanisms are not working effectively, coordination of the system is inhibited, and individuals depending on the system may make erroneous production decisions. The result will be a poor allocation of existing resources in the light of consumer demands. Such problems frequently arise in a developing economy as a result of continuously changing attitudes, tastes, and desires. The price system is frequently slow or ineffective in communicating those changes to individual producers, especially if there are time lags associated with long production cycles. Moreover, we are talking about an extremely complicated and continuous process in which interactions in the market are continually altering the attitudes and perceptions of both producers and consumers. The market price system may have some difficulty in transmitting the effect and magnitude of such changes.

In summary, market coordination may be defined as the process in an exchange system whereby producers, distributors, and consumers interact to exchange relevant market information, establish conditions of exchange, and accomplish physical and legal transfer of economic goods. Through this coordination of independent participants using the information provided by flexible product prices, basic resource allocation decisions are made independently by producers, distributors, and consumers to determine what will be produced by whom plus where, when, and in what form the products will be delivered.

II. AN OVERVIEW OF THE DEVELOPMENT OF THE PUERTO RICAN ECONOMY

Puerto Rico was discovered and claimed for Spain by Christopher Columbus in 1493. In the early 1500's the island was colonized, and it soon became an important link in the defense and trade pattern of the Spanish Empire. The main natural resources of the island were agricultural land and a plentiful supply of water, and until the 19th Century the primary products of the island were coffee, ginger, sugar, molasses, and hides. The Spanish colonialists exported most of those products, draining nearly all of the wealth from the island. In 1765, an island-wide census indicated a population of 44,883, of whom 5,037 were slaves. Most of this population lived in extreme poverty and ignorance on farms controlled by absentee owners. (Perloff, 1950)

In 1898, during the Spanish-American War, the United States took possession of Puerto Rico. By that time the island was already heavily dependent upon external trade. Its main exports were coffee and sugar, while food products made up the bulk of imports. Sugar production expanded rapidly after the American takeover, and sugar soon became the dominant economic product of the island. During the period from 1898 to 1927, there was a large influx of American capital, principally for the production and processing of sugar and tobacco. The economic stimulus provided by this flow of capital contributed to a rapid increase in the gross product of the island and precipitated a build-up in the island's economic infra-structure. But it did little to alleviate the poverty of the average Puerto Rican.

Amid growing discontent a new political party was formed in 1938. Its leader, Luis Muñoz-Marin, was wholly dedicated to political, social, and economic reform. Overwhelming political support for Muñoz-

Marin and the reforms he advocated led to a period of remarkable economic growth accompanied this time by needed social change. From 1950 to 1960 gross income practically doubled, manufacturing became a real economic factor, tourism blossomed, and agriculture began a relative decline in importance.

Operation Bootstrap was the name given to the reform program designed to bring about the growth in Puerto Rican income. The agency charged with implementing Bootstrap was Fomento. Fomento is a Spanish word which has no exact counterpart single symbol in English, so the agency is known in English as the Economic Development Administration. The agency was the successor to the government agency PRIDCO (Puerto Rican Industrial Development Company) which had attempted to operate several businesses as government enterprises. As it became increasingly evident that the government did not have sufficient financial or managerial resources to operate the businesses, the Economic Development Administration (EDA) was created in 1950 and PRIDCO became a part of it (Fomento). The emphasis was shifted from government-owned to government-encouraged private operations.

The administrator of EDA, Theodoro Moscoso, was given the responsibility "to direct and supervise all of the programs whose objectives are closely related with the economic promotion of Puerto Rico." (Stead, 1958, p. 7) The main thrust of the EDA has been toward promotion of industrial development and tourism. It provides assistance to firms or individuals interested in establishing new plants in Puerto Rico. It also has done a great deal of general promotional work for the island through a number of branch offices in major cities of the United States. As of December 1965, the industrialization program had helped to bring some 1,211 plants with a total employment of 82,175 to the island.

During the period from 1940 to 1950, much of the growth in the economy took place in the agricultural (especially sugar cane) sector and also in commerce and services. By contrast, manufacturing was the largest growth component between 1950 and 1960, underscoring the successful drive by the government to increase industrialization after 1950. Table 2-1 shows that during the decade between 1950 and 1960 agricultural gross output increased by 32 percent compared to a 76 percent increase for the whole economy and a 212 percent increase for the manufacturing sector.

Table 2-2 contains employment figures which reflect the changes which were taking place in the Puerto Rican labor force during the 1950's. In 1950 the total employment in Puerto Rico was 596,000. Thirty-six percent was agricultural employment and nine percent manufacturing. By 1960, employment in agriculture had fallen to 24 per-

cent and manufacturing had risen to 16 percent. Unemployment during that ten-year period declined only slightly from 13 percent to 12 percent of the labor force.

Table 2-1.—Gross Domestic Product, Agriculture and Manufacturing Gross Product and Percentage Increase From 1950 to 1960 for Puerto Rico (1954 Dollars)

	Millions of Dollars		
	1950	1960	% Increase
Gross Domestic Product	844.1	1488.8	76
Agriculture	132.1	173.8	32
Manufacturing	110.2	343.34	212

Source
Ingreso y Producto, Junta de Planificacion de Puerto Rico.

Table 2-2.—Employment in Puerto Rico by Industry—Selected Years

	1950		1960	
	Thousands	%	Thousands	%
Total Employed	596	100	564	100
Agriculture	216	36	133	24
Manufacturing	55	9	93	16
Other	325	55	338	60
Unemployed	88	13	75	12

Source
Statistical Yearbook of Puerto Rico, Puerto Rico Planning Board.

These statistics illustrate the magnitude and the type of economic changes which occurred in Puerto Rico during the brief span of ten years. Large investment funds were needed to accomplish the shift from an agricultural economy to an economy with considerable emphasis on manufacturing. Gross fixed domestic investment increased from $111 million in 1950 to $348 million in 1960, an increase of more than 200 percent. A significant part of that investment came from external sources, largely U.S. mainland private investors. About 43 percent of all Puerto Rican investment funds came from external sources between 1947 and 1960. The bulk of the external investment was spent for new plants and equipment; most of the 57 percent internal investment was used for depreciation and public saving. Puerto Rico's rapid growth during the 1950's was the result of two factors: (1) a strong political unity centered around the single purpose of achieving better levels of living for all the people; and (2) a well-planned industrial development program designed to make the most of Puerto Rico's unique relationship to the United States under commonwealth status.

A major challenge of any developing nation is the achievement of political stability. Puerto Rico has not displayed the political instability of other Latin American nations, perhaps because Puerto Rico has never been completely independent. In 1952, after a period of territorial rule by the United States, the Puerto Ricans chose commonwealth status which provided most of the advantages of independence without many of the disadvantages. During the period of territorial rule the people of Puerto Rico and their political leaders were given practical experience in the operation of a democratic society. They had a locally elected legislative assembly. When the Puerto Rican governor and his administrators took over as leaders of the commonwealth, most government agencies were staffed by well trained individuals and were organized for relatively efficient operation. Moreover, the continuing loose tie to the United States lent a considerable degree of political, economic, and social stability that encouraged rapid industrial growth. In addition, private citizens of the United States continued to be able to invest freely in Puerto Rico without fear of government confiscation.

Economists have often noted that economic growth can be drastically retarded by "limitations of the market." If the market for a given product is quite small, it may be impossible to achieve all the potential economies of scale in production and distribution of that product. It is therefore significant that Puerto Rico under territorial and commonwealth status has had, with few exceptions, the same trade status as any state in the Union. Under this arrangement the United States has long purchased the bulk of Puerto Rico's product—sugar. In fact, Puerto Rican sugar producers operate under the same government price support and quota program as United States producers. In exchange, the Puerto Ricans have historically purchased from 40 to 50 percent of their food supply from United States producers and processors in addition to significant proportions of other consumer and producer goods. More recently the United States market has served as an outlet for the diverse products of manufacturing plants established under the assistance and encouragement of the Economic Development Administration. In many cases the free access to United States machinery, cheap Puerto Rican labor, and access to the huge United States finished product market are critical factors in making manufacturing investments in Puerto Rico feasible for prospective investors.

Another advantage to the Puerto Rican economy is the official use of United States currency. As a result, Puerto Ricans do not have currency exchange problems when trading with the mainland; they are not bothered with balance of payments difficulties or currency devaluation as in United States capital markets.

Federal assistance and unilateral transfers have been extremely im-

portant to Puerto Rico in its rapid economic development. Practically all federal government programs available to state or municipal entities on the mainland are available in Puerto Rico. In agriculture this includes all the service agencies such as the agricultural extension service, experimental station research, soil conservation service, etc. It includes credit agencies such as the Farmers Home Administration and certain federal price support programs such as the sugar program mentioned earlier. Other federal agencies such as the Small Business Administration, the Federal Housing Administration, the Urban Renewal Administration, the Federal Communications Commission, and the Federal Aeronautics Administration provide services to the people of Puerto Rico. The unilateral flow of funds from the United States into Puerto Rico through these federal programs (without a return flow of revenue since Puerto Ricans do not pay federal taxes) accounts for a significant portion of the gross product of the economy. In 1965 transfer payments from the U.S. Treasury made up about 8 percent of the gross domestic product for the island.

There is little doubt that Puerto Rico's special relationship to the United States does provide significant economic advantages. Political stability, free trade, common currency, and access to federal programs have contributed greatly to the rapid rate of economic growth which Puerto Rico has achieved in the past twenty years.

Agricultural Development

Because of the lack of mineral resources, the relative isolation, and the high population density, the Puerto Rican economy has historically been highly dependent on agriculture. Sugar cane has been especially important as a source of employment for the rural inhabitants and a source of export earnings to support the urban economy. In the past 15 years certain forces have been set in motion that appear to be basic long-run structural changes in the Puerto Rican agricultural sector.

Topography and Resources

The island of Puerto Rico is located in the Greater Antilles chain which stretches from the southern coast of Florida to the Northern coast of Venezuela. The chain of islands includes Cuba, Haiti-Dominican Republic, United States and English Virgin Islands, Jamaica, Trinidad, and a number of other islands. Puerto Rico is located about 1,000 miles southeast of Miami, Florida. The maximum length of the island is 113 miles and the maximum width is 41 miles. The total land area is about 3,435 square miles. Extending all around the coast of the island is a narrow fertile plain which rises gradually to a mountainous

interior. The mountainous and hilly terrain occupies a major portion of the land area on the island.

The average temperature for the island as a whole ranges from 73 degrees Fahrenheit in January to 79 degrees in July. Temperatures, of course, are higher in the lowlands and lower in the mountainous areas, but the two extreme temperatures on record are 39 and 104 degrees. And the tradewinds, blowing almost constantly from the northeast, serve to moderate the temperatures of the island.

As a result of the central mountain range, rainfall varies tremendously from the northeastern part of the island to the southeast. Annual rainfall varies from a maximum of 200 inches on the mountain of El Yunque in the northeast to a minimum of 30 inches along the southwestern coast. Generally, rainfall ranges from 30 to 80 inches in the fertile coastal plains and from 60 to 100 inches in the highlands. In most areas of the island, the rainfall is sufficient to support a wide variety of agricultural enterprises. Irrigation systems have been developed in the drier areas to the south and in a small area in the northwest where yearly rainfall is light or unevenly distributed through the year.

The natural resources of Puerto Rico are limited primarily to agricultural land and water. There are few mineral deposits. Although there are small deposits of iron, nickel, copper, manganese, lead, and zinc, none is large enough to warrant commercial exploitation at the present time. The only minerals currently being utilized commercially are those used primarily in the construction industry; Puerto Rico produces most of its own supplies of cement, marble, and gravel. In addition, there is some salt mining activity in the southwestern part of the island.

Puerto Rico, with a total population of some 2.5 million on a total land area of 3,435 square miles, is one of the most densely populated areas of the world. Since natural resources are limited, the people have traditionally depended heavily upon the land for their livelihood. Therefore, many acres are in cultivation which under other circumstances would be left to forest or pasture. Even so, in 1964 it was estimated that the total agricultural land area of 1,850,000 cuerdas* was utilized as follows: croplands occupied about 690,000 cuerdas, pastures about 800,000 cuerdas, forests and woodland about 300,000 cuerdas, and nonproductive farm land about 60,000 cuerdas (Puerto Rican Department of Agriculture, 1966).

Dominance of Sugar Cane

Sugar cane has historically maintained a position of vast importance in the Puerto Rican economy. More land is used for sugar cane than for

* The unit of land measurement in Puerto Rico is the cuerda. Often the term is used interchangeably with acres since one cuerda is equivalent to about .97 acres.

any other purpose except for pasture. In 1965 about 290,000 cuerdas, or almost one half, of the island's cropland was devoted to the production of sugar cane. The dominance of sugar cane in the economy was even more pronounced prior to 1950. According to Harvey Perloff (1950), the sugar-based industries were the source of 20 percent of the island's net income in 1940 and 14.4 percent in 1946. In addition the sugar industry was by far the largest employer in the economy. Sugar cane acreage harvested and tons produced generally show a continuous increase from 1938 to 1951. During that time the area harvested almost doubled from 216,502 cuerdas to 391,763 cuerdas. Since 1951, because of competition from other enterprises, especially dairy, acres of sugar land harvested have shown a continuous decline with total production remaining about the same despite yearly fluctuation. Much of the land taken out of sugar production was less productive marginal cropland. While sugar is still a major factor in Puerto Rico's economy, its position has become less significant with the rapid expansion of other sectors of the economy.

Relative Stagnation in the Sugar Industry

The sugar industry in Puerto Rico is often described as a sick industry. There is a great deal of concern over the decline in acreage, and particularly over the slow rate of improvement in land and labor productivity. Advisers to the sugar interests argue that Puerto Rico's economic future is closely tied to the sugar industry and that stagnation there may be disastrous for the economy in the long run. This appears to be an exaggerated forecast. The sugar industry has been experiencing a period of rapid adjustment along with other sectors of the economy. However, there is no reason to assume that sugar production will maintain indefinitely its place of dominance in the Puerto Rican economy. The Puerto Rican sugar industry may well be entering a long period of adjustment like the one experienced by the cotton industry in the southern United States. And other industries may well replace sugar as the number one Puerto Rican business.

A number of factors appear to have contributed to the current adjustment or decline in the sugar industry. First, prior to and during the Korean War, Puerto Rican sugar producers were in a relatively favorable position compared to other areas producing for the United States market. As a result, production expanded and the industry experienced a kind of boom. By the end of the Korean War, Cuba and Hawaii were well on their way to mechanizing sugar production and increasing productivity through fertilizer use, improved varieties, and improved management. For some reason Puerto Rican producers never moved to adopt these technologies to any great extent. Under the gov-

ernment program established by the Jones-Costigan Act, the price of sugar for the United States is established by a price support plan. Since most sugar producing areas moved fairly rapidly to adopt the latest technologies, the cost of production per ton was held down. As a result, sugar support prices did not increase as rapidly as the general price level. Since Puerto Rican producers had not moved to reduce costs of production by adopting new technologies, they were left in a comparatively unfavorable position.

The rising cost and shortage of labor since 1950 have also affected the sugar industry. The government's thrust toward industrialization has brought an increase in the demand for labor in nonagricultural employment. Higher wages, steadier work, and better working conditions have lured many of the more competent cane workers into the urban areas. The unionization of sugar cane workers, which was supported by the administration of Governor Muñoz-Marin, has been a factor in rising labor costs for cane producers.

A third factor affecting Puerto Rico's sugar industry is the land tenure arrangement and the size of farms. The bulk of the sugar production in Puerto Rico comes from either very large or very small farms. There appear to be relatively few medium sized single-owner-operator farms of adequate scale to achieve maximum efficiency. In 1963-1964 almost 11,000 farms harvested something less than 25 cuerdas per farm (see Table 2-3). These farms accounted for about 19 percent of the cane acreage harvested but only 15 percent of the total production. The average production per cuerda was 26.4 tons. On the other hand,

Table 2-3.—Production of Sugar Cane and Number of Farms According to Size of Area Harvested, 1963-64

Acres Harvested	No. Farms	Area Harvested Cuerdas	Cane Produced Tons	Cane Produced per Cuerda Tons
All Farms	12,317	303,141	9,801,584	
0-25 Cuerdas	10,757	58,208	1,537,613	26.4
26-250 Cuerdas	1,368	97,108	2,757,571	28.4
251 or more	192	147,825	5,506,400	37.2

Source
Facts and Figures on Puerto Rico's Agriculture, Puerto Rico Department of Agriculture, p. 42.

over half of the total production of cane came from the 192 farms harvesting more than 250 cuerdas per farm. Thus, technological adoptions and accompanying cost reductions may have been thwarted by the size of cane producing units. The owner or tenant with an extremely small farm unit may not have the knowledge about new production technol-

ogies; he may not have the training to use them; or he may not be financially able to adopt them. On the other hand, the very large farms are often controlled by absentee owners who spend little time and effort on the farm, leaving it to hired managers who may be quite unprogressive.

Shift Toward Livestock Production

The dominance of sugar production in the agricultural economy of Puerto Rico, with its emphasis on exports, has meant that a significant part of the island's food needs are imported. Puerto Ricans import about 50 percent of the food consumed on the island. Sugar cane occupies the best land. In addition to sugar, tobacco and coffee are important crops; they too focus on the export market. In 1951 about 63 percent of Puerto Rico's gross farm income went to producers of coffee, tobacco, and sugar.

As a result of the dominance of export crops, relatively little emphasis has been placed on food production. Milk has been the most important food item produced in Puerto Rico. In 1951 milk sales accounted for approximately 10 percent of Puerto Rico's gross farm income. Other major farm products in descending order of importance in 1951 were: poultry, beef, pork, starchy vegetables, fruits, eggs, and other vegetables.

The adjustments in sugar production mentioned earlier have had some impact on the production of a few of these food products. Table 2-4 shows the percentage change in the production of major agricultural products from 1951 to 1963. These figures reveal that the most significant increases in production occurred in milk, eggs, meats, and coffee. If we look at gross farm income, we find that by 1963 sugar's contribu-

Table 2-4.—Percentage Change in the Production of Major Agricultural Products in Puerto Rico 1951 to 1963

Product	Percentage Change
Sugar	−4
Tobacco	+34
Coffee	+130
Milk	+128
Meats	+55
Starchy Vegetables	−12
Fruit	+20
Eggs	+128
Other Vegetables	+52

Source
Facts and Figures on Puerto Rico's Agriculture, 1965, Puerto Rico Department of Agriculture.

tion had declined to about 37 percent of the total income, while milk sales alone accounted for about 18 percent of the total. Looking at all livestock products including meats, eggs, and milk, we find that their farm value increased from 25 percent of gross farm income in 1951 to 35 percent in 1963.

The rising demand for protein foods in the Puerto Rican diet has probably been the most important impetus toward livestock production in Puerto Rico. Rapidly rising incomes have permitted consumers to eat more of the relatively expensive livestock products. Puerto Rican producers have observed the increasing demand and moved into these areas.

The improvements in the Puerto Rican economy reflected in the changing production and marketing patterns did not "just happen." Nor was their sole cause Puerto Rico's advantageous relationship with the United States. In the next two chapters we will look at the changes in the Puerto Rican food retailing system from 1950-1965—changes which were instrumental in the remarkable growth of the economy during this period.

III. BACKGROUND FOR CHANGE

The food distribution system on this smallest island of the Greater Antilles, which lies 1,600 miles southeast of New York City and 1,300 miles east southeast of Miami, has changed radically in the last 15 years. Some economists contend that perhaps the changes in food distribution helped bring about the five percent per year growth of per capita incomes during the same period. Puerto Rico is one of the few political areas where the government sponsored studies of food distribution changes and then took action to implement suggested changes.

The foundation for the government programs during the 1950's was laid by the first-elected governor, Luis Muñoz Marin. His leadership promoted the formation of the Planning Board in 1942 and led to a broadgauged study. (Perloff, 1950) The Perloff study, in turn, encouraged numerous and detailed studies, such as "The Structure and Efficiency of Food Marketing in Puerto Rico." (Branson, 1954) and *Marketing Facilities for Farm and Related Products at San Juan, Puerto Rico.* (United States Department of Agriculture, 1951) These studies and field work by the Social Science Research Center of the University of Puerto Rico led to the Galbraith and Holton book (1954) which resulted in the Food Commission hearings, and in turn led to action by Fomento beginning in late 1954. These early studies led to the introduction of such innovations as the Pueblo Supermarkets and the Central Market in the Puerto Nuevo area.

In the late 1930's and 1940's, the Economics Section of the University of Puerto Rico Agriculture Experiment Station, under the leadership of Dr. Luis Sol Descartes, published a number of studies concern-

ing food consumption and nutritional levels. The School of Tropical Medicine and the School of Home Economics also were studying the nutrition of the island's people. In late 1940, a study was commissioned by the University's Social Science Research Center. Dr. Harvey Perloff was asked to make an objective analysis of the complex economic structure then developing on the island. Perloff's appraisal of the nature and economic possibilities of Puerto Rico was published in 1950 by the University of Chicago in a book entitled *Puerto Rico's Economic Future*.

Puerto Rico's Economic Future

Perloff noted in his discussion of Puerto Rico as it existed in 1950 and before, that the expenditures of most Puerto Rican families were limited to the basic necessities. In fiscal 1940, such expenditures equaled 45 percent of total consumption and, in fiscal 1944, they were 51 percent. (Perloff, 1950) Perloff also called attention to an earlier study of wage-earner families which showed that 60 percent of income was being spent for food alone. Still, the diet of many Puerto Rican families was nutritionally inadequate.

Table 3-1.—Recommended per capita food consumption in Puerto Rico as compared with actual per capita consumption, 1940-41

Food Group	Per Capita Requirements (Lbs. per Year)	Actual Consumption Shown by Wage Earner Study (Lbs. per week x 52)
Milk and dairy products (except butter)	581	153
Potatoes, other starchy vegetables, fruits (except citrus)	338	418
Dried beans, peas, nuts	28	63
Citrus fruits, tomatoes	81	25
Leafy greens and yellow vegetables	102	6
Eggs	23	8
Lean meat, poultry, fish	73	41
Flour, cereals (including rice)	190	215
Fats and oils(including salt pork)	47	36
Sugar	47	60

Source
Perloff, Harvey (1950). *Puerto Rico's Economic Future.* (Chicago) Table 89, p. 172.

Perloff identified many problem areas in the economy, including overexpansion of the number of retail food stores which, instead of lowering prices, actually added to the cost of distribution. In 1939,

Puerto Rico had 20,000 retail establishments as compared to Hawaii's 4,000, but there were only 8,000 paid retail employees in Puerto Rico while there were 13,000 paid employees in Hawaii. (Perloff, 1950) Another problem which faced the island was its inability to supply its own needs, even though it was geared to agricultural production. Farm products, sugar, coffee, and tobacco constituted more than 80 percent of Puerto Rico's total exports. In the 1940's, 42 percent of the volume and 54 percent of the value of foodstuffs consumed on the island had to be imported. As a partial solution, Perloff recommended importing bulk grain and rice and processing them on the island so that end products could be obtained more cheaply. This method would also provide additional employment for local labor.

Probably the greatest marketing problem uncovered by Dr. Perloff was the poorly organized agricultural marketing structure. His survey indicated that there was good land available for crops; there were many available workers; and there was a definite need for the crops produced. But food still had to be imported at a very high cost. Perloff called for a revamped food production and marketing system within the island. His suggestions included the expansion of public market facilities in urban areas and the establishment of cooperative-type fruit and produce centers in rural regions, which would also provide grading, packing, and storage facilities at strategic shipping and distribution points.

> The important point is that improvements in Puerto Rican agriculture are virtually dependent on the improvements in the agricultural distribution structure, which would narrow the gap between farm price and consumer price, reduce waste and spoilage, and generally increase the amount of food reaching the consumer in good condition and at a reasonable price. (Perloff, 1950, p. 276)

Throughout his book, Perloff made projections of the patterns that would need to be operating by 1960 if the people of the island were to achieve some economic advance. These patterns indicated a number of vital relationships which he felt were often overlooked.

> By following through the logic of the interrelationships it can be seen that the success of an industrial program which requires a solid base of consumer purchasing power, is dependent to a significant degree on the success achieved in raising farm yields, since that is the key to increased food production and real savings in food purchases for the consumers. By the same logic of interrelationships, improvements in the diet of the people are intimately tied to sound land use planning, while the total amounts of income and employment on the island are dependent in large measure upon the success of research, pilot plant and commercial experimentation in developing new crops. (Perloff, 1950, p. 331)

Thus he laid the cornerstone for the forward planning which resulted in many studies and much political action in Puerto Rico.

Political Background

The problems of inadequate diet, high food costs, and a low standard of living concerned not only economists such as Perloff but also the politicians. One politician in particular, Luis Muñoz-Marin, saw the problems in terms of interrelationships, as did Perloff. His campaign slogan during the election of 1940, "Pan-Tierra-Libertad" (Bread-Land-Liberty"), indicated his involvement with, and understanding of, the economic situation.

Actually, the reforms began with the appointment of Governor Rexford G. Tugwell in 1941 which signalled a new era in Puerto Rico's struggle for economic and social advancement. The Presidential appointment of this reform-minded governor, coupled with the creation and popular support of a new political party headed by Luis Muñoz-Marin, indicated a new concern both in Washington and Puerto Rico for economic and social reform on the island. During the period from 1941-1948, Tugwell and Muñoz moved rapidly to lay the legislative and administrative foundation for self-government for Puerto Rico.

In *Poet in the Fortress* (1965), Thomas Aitken, Jr., describes Muñoz-Marin's early confrontations. In 1932, Muñoz-Marin achieved his first elective post, senator-at-large for the Liberal Party. According to Aitken, in the early part of that year, Muñoz-Marin argued for independence because of the high prices of the foods Puerto Ricans had to import. Muñoz-Marin said "The North American tariff was set by the North American Congress to protect the interests of the American people. And it will annihilate Puerto Rico obliquely, in passing, almost without thinking, with the brutal innocence of an elephant walking on a colony of ants." (Aitken 1965, p. 97)

Earlier Muñoz-Marin had expressed dissatisfaction with President Roosevelt's gubernatorial appointment in 1932: "Over and above all these things is the fact that our people are dying of hunger . . . And in the face of this reality, we are playing politics." (Aitken 1965, p. 102) The years 1934-1936 were years of frustration for Muñoz-Marin because he was out of office and politically powerless. But, on July 22, 1938, he announced the formation of the Popular Democratic Party, the party which in the future would challenge the power of the aristocracy. At an early meeting of the party, Muñoz-Marin explained the differences between freedom and independence:

> Man could not find freedom in political independence alone. He must first be liberated from the binding grip of hunger. He must be relieved of the ubiquity of filth and escape from

> exposure of semi-nakedness. He must have a shelter safe from rain or the burning heat. His freedom requires a fair chance to live without sickness wringing his intestines, boiling his blood, or throbbing in his head. He needs an opportunity to earn a living to work without the nagging fear that disease and malnutrition may be debilitating his children. Liberty, if a man is industrious enough, includes a parcel of land on which he may raise some food for his family and, luckily, a bit more to sell. Freedom is being a man, not a beast of burden. When this liberty is won, and only then, can political bonds be challenged as obstacles to liberty. Then independence might mean liberty, too. (Aitken, 1965, p. 130)

The Popular Democratic Party held its official constituting meeting on July 21, 1940. The party leadership presented a program for approval that evening. The program supported an existing law limiting corporate land owners to 500 acres, a law which had been part of a bill passed in 1900 by the U.S. Congress, but which had been ignored for the most part. The Party's program included protection of agriculture and farm rights, a market place for fruit and produce, agricultural cooperatives, and a food commission to reduce the cost of living.

The Party feared that the *jibaro* (colloquial Spanish for a man from the countryside) might again sell his vote for a dollar or two, since he knew from experience that empty political promises brought nothing. To combat this possibility, the Popular Party candidates publicly swore that, if elected, they would implement every plank in the Party platform. Their apparent honesty and good faith were rewarded. The elections of 1940, while not a landside victory, gave the Popular Party 10 senators and 18 representatives, while an opposing party, the Coalition, had nine senators and 18 representatives. In Ponce, the center of Spanish traditionalism, a well-known patriarch of a wealthy sugar family was defeated by a worker candidate of the Popular Party. For his own part, Muñoz-Marin received the largest vote of the candidates for senator-at-large, which assured his election as president of the senate.

As senate president in the Puerto Rican legislature, Muñoz-Marin was the third most powerful political leader in Puerto Rico. The most influential was the presidentially appointed American governor, and the second most influential was the resident commissioner from Puerto Rico who served in Washington .

Aitken quotes Muñoz-Marin at the opening of the legislative session, February 10, 1941, as saying:

> The land problem was specifically discussed before the people. The people were asked if they wanted the breaking up of concentrated land holdings. . . . The people were clearly told that on their votes depended the decision as to whether this land

> policy be followed or not. The resolve to lower the price of staple foods and raw materials was explained to the people. The people by their votes directed that this policy be followed . . . There was expressed the intention to establish general minimum wage legislation. . . . The people, by their votes, directed that this policy be carried out. . . . For these purposes, and subject to these orders, the people have elected us. Here we are. (Aitken, 1965, p. 154)

Using his position to remind the senators to make good on their campaign promises, Muñoz-Marin made the years of 1941 and 1942 very productive ones for Puerto's Rico's economic future. It was during this time that the Water Resources Authority, the Communications Authority, the Puerto Rico Industrial Development Company, the Government Development Bank, and the Land Authority were established. The Puerto Rican Planning Board was set up to coordinate these agencies.

At the same time, World War II was having a profound effect on Puerto Rico's economy. Since imports of Scotch were cut off to the United States mainland and grain used in alcohol was not available, Puerto Rican rum found wide, though grudging, acceptance. Prices rose for this product, as well as for two other export products of the island, sugar and tobacco. The excise taxes collected by the federal government were turned back to the island treasury, giving the insular government $160 million above its expenses. Certainly the dollars spent by the armed forces on the island also added to the revenues of the island's citizens and government. This same prosperity reached into the other countries of Latin America:

> Argentina's coffers were swollen from sales of wheat, other cereals, and meat. Brazilian millionaires became almost as numerous as her coffee beans. Venezuela fattened on oil exports. Colombia, Peru, Mexico, Cuba, Uruguay, every Latin American country, had food and raw materials to sell to a buyer who was almost unconcerned about the price. Many of those who have called the open American marketplace a special advantage for Puerto Rico have had short memories for the years when the Allies were insatiable buyers for nearly every product all Latin America could offer . . . Muñoz-Marin and his team insisted on reinvesting the government surplus in a program of social projects to build the spirit, the health, the education, and the working capacity of the Puerto Rican people. They also initiated a program of industrial development to provide postwar employment. Most Latin American nations concentrated the benefits of their gains within a limited sector of wealthy families who used the new wealth to buy land, political influence, and the protection of a series of practorian guards for captive government. (Aitken, 1965, p. 161)

Aitken goes on to point out that in some of the other Latin American countries, "The man with a hoe was forgotten—until the day he should exchange it for a gun." (Aitken, 1965, p. 162)

In 1944, prior to the Popular Party convention, Muñoz-Marin had a long talk with Ben Dorfman, an American tariff expert who had worked on plans for the economic separation of the Philippines from the United States and who was engaged in a study of Puerto Rico's economy. Dorfman pointed out that Puerto Rico and the Philippines would produce similar products for sale on the American market. Since the Philippines had more natural resources, their products could be sold more cheaply. He explained to Muñoz-Marin that an independent Puerto Rico competing with the Philippines for the American market would starve.

In 1945, Muñoz-Marin spelled out in the San Juan newspaper, *El Mundo*, his philosophy and his thoughts about where Puerto Rico was going. There, for the first time, he talked of the commonwealth in fairly clear terms. In June of the next year, he wrote two articles for *El Mundo* called "New Solutions for Old Problems." In these articles, he defined liberty and the contrasting forces pulling on it. He wrote that man must first of all be free from the fear of hunger; then he could have the liberty to govern himself. On July 25, 1946, Governor Tugwell, who had worked so closely behind the scenes with Muñoz-Marin, resigned. In 1947, the United States Congress accorded Puerto Rico the right to elect its own governor beginning in 1948. The congressional resolution of approval for the Commonwealth of Puerto Rico in its associations with the United States was signed into law by President Truman on July 3, 1952. Finally, on July 25, thousands of Puerto Ricans watched Governor Muñoz-Marin raise the flag of Puerto Rico.

Muñoz-Marin was more than a politician. Before Puerto Rico achieved commonwealth status, it was Muñoz-Marin's leadership that resulted in the formation of the semi-independent agencies which so contributed to the development of the island. All the agencies established in 1941-42 survived the tumultuous years of development. However, the Puerto Rico Industrial Development Company (PRIDCO), which was charged with setting up and operating a few government-owned industrial plants, did not satisfactorily meet the needs of the situation. As Teodore Mocoso, the first and up to that time only head of PRIDCO, said:

> We soon became aware, however, that government had neither the financial nor human resources to establish and manage the thousands of factories which were required . . . to raise the standard of living of our people. . . . (Winsemius and Pincus, 1962, p. 101)

Thus, in the late forties Fomento was organized and PRIDCO then became the financial arm of Fomento. Moscoso's comments about the formation of the Fomento agency follow:

> When I began to experiment in development work in Puerto Rico, it was far from a recognized discipline. We called it *Fomento*, which is generally translated as *development*. But the two words do not mean the same thing, and the difference in connotations may hold some lessons for us today. Development is generally associated with a variety of social and economic objectives . . . *Fomento* has an earthier ring. Its origin was the political decision of Governor Luis Muñoz-Marin to make a massive attack on stagnation in Puerto Rico and to convert the island into a socially healthy and economically prosperous community. The work of *Fomento* . . . was made possible by the Governor's success in protecting us "fomentarians" with the shield of his political leadership. (Hambridge, 1964, p. v)

Fomento had many tasks. In general, it was the primary agency for bringing about a rapid economic development of Puerto Rico.* It is best known today in the United States for its very successful industrial development program. A part of this program was the implimentation of the Governor's Food Commission report. The philosophy underlying this implementation was to provide the island with a balanced competitive scene.

Early in 1949, Governor Luis Muñoz-Marin requested the assistance of the Marketing and Research Facilities Branch, Production and Marketing Administration, U. S. Department of Agriculture, in undertaking a study of the marketing facilities and distributive system of Puerto Rico, with special emphasis on the needs of metropolitan San Juan. The study began in the fall of 1949. A preliminary statement covering the major marketing facility problems of the San Juan area was presented to the government of Puerto Rico at an informal meeting during July, 1950. In December, 1950, a preliminary report was presented in a series of meetings to government agencies and private individuals and firms interested in the market. This report noted that:

> The primary defects in the San Juan facilities for handling food and related products are: (1) the lack of sufficient warehouse facilities at shipside; (2) the splitting of market operations among several market areas; (3) the excessive costs of cartage, deterioration, and spoilage; (4) the absence of a suitable livestock market with the necessary slaughtering and processing facilities for proper handling of animals, particularly of heavier weights; (5) the lack of grain storage, feed mixing, and milling facilities for efficient handling of imported

* See Stead (1958) for complete description of early years of Fomento.

> grains and the lack of utilization of the various commodities produced on the island that could be used in mixed feeds; and (6) the need for vegetable oil extracting facilities. (United States Department of Agriculture, 1951, p. 1)

To correct these deficiencies, the report recommended that facilities be constructed for a wholesale produce market, that a slaughtering and meat processing plant be established, and finally that grain storage, feed mixing, and vegetable oil extracting facilities be established in the same area as the produce market and livestock slaughtering plant. The report recommended that each of these be built to a specific size and in the same general area. About 79 acres of land would be required, which should be located in a given area immediately southwest of the mouth of the Martin Peña Canal. It is interesting to note that today in Puerto Rico there are grain storage facilities and a new market area for wholesale operations located in that area. The bulk grain storage is privately owned, while the Puerto Nuevo Central Market is government-owned and rented to private businessmen.

About this same time another aspect of the food problem, that of retailing, was the subject of a study done by Robert Branson. A group of professors from Harvard University had been invited by the Social Science Research Center of the University of Puerto Rico to do a study of food retailing and wholesaling on the island. Branson, a doctoral candidate from Harvard, was hired by the group to do some of the necessary research. He was able to coordinate his work with Caleb Otten, of the U. S. Department of Agriculture, who was able to use some of the same survey work.

Branson undertook a detailed study of the economics of Puerto Rico's food distribution in 1949 and 1950. One of his conclusions was that there were too many retail and wholesale firms for proper return and efficiency. A second conclusion was that credit as it existed in the food distribution business was doing a terrible disservice to the island:

> At present, rightly or wrongly, a considerable part of the burden of feeding the economically destitute in Puerto Rico is being born by the food marketing structure, in the form of overextension of credit to these groups. This larger aspect of retail store credit will eventually have to be faced in terms of policy issues which extend beyond the confines of the food marketing structure itself. It is sufficient to mention the inherent ramifications; some consideration will have to be given to this problem later. (Branson, 1954, p. 182)

Branson found that retailers who needed capital acquired it by using their credit with wholesalers, rather than by borrowing from a bank. Consequently, their ability to participate in competitive purchasing was severely restricted, and partly due to this, food prices to the consumer

remained high. One of the reasons for this was the high bank interest rates resulting from a lack of venture capital in Puerto Rico. Those who owned capital on the island avoided risky investments.

Branson, through a description of the economic conditions prevailing in food retailing and wholesaling, laid the foundations for the Galbraith and Holton study with its detailed recommendations for change in the food distribution system.

The Galbraith and Holton Report

Both Branson's analysis and the United States Department of Agriculture report provided much of the necessary data. What was needed now was a theory based on this data that could be put to work. Richard Holton and John Galbraith were called upon to do the analysis and make policy recommendations. Holton's major recommendation involved a model food system, comprised of the optimal retail unit, the optimal wholesale unit, and an estimation of the saving that could result if the food system was rationalized. Galbraith suggested that specific policy measures be developed for improving the efficiency of the marketing system through consumer and retailer education as well as through direct steps, such as supermarkets in urban areas, and cooperatives in rural areas. These policy measures served as a basis for the Food Commission report to Governor Muñoz-Marin in 1954. All of the suggestions made by Galbraith in 1954 have been implemented.

According to the 1950 census, there were 2,210,703 persons in Puerto Rico served by 16,747 retail food stores; one grocery store for every 156 inhabitants. This compares to one grocery store for every 396 inhabitants in the United States as long ago as 1929, and one store for every 581 persons by 1954. (Brown, 1961) Yet, only 6,569 of the 16,747 establishments in Puerto Rico recorded more than $3,000 gross sales for the year 1949.

In 1948, in the United States as a whole, food stores averaged sales of $62,062. (United States Bureau of Census, 1948) The 6,569 Puerto Rican stores grossing over 3,000 sold $97,292,900 of the total $109,192,100 retail food sales. Thus, even the larger stores averaged only $14,907 in sales annually, far less than the U. S. average.

The independent Galbraith and Holton study of food retailing, made in 1950 before the census results were available, was based upon an island-wide sample of 425 food stores and 52 fruit and vegetable stores, excluding street vendors and other specialized businesses that were covered in the census. In addition, stores with less than $1,000 annual sales, were omitted. Still, the average sales per store was only $24,000 a year. Even in the Galbraith and Holton study which looked at the

larger food stores, one can estimate that more than 50 per cent of those stores had less than $600 per month gross profit out of which all expenses including wages were to be paid. There were few, if any, retailers getting rich on profits from their small stores.

Purchasing food on credit was almost universal in Puerto Rico in 1950. Between 40 and 80 per cent of the total sales were on credit. Credit was even more prevalent in stores catering to high-income families, where 75 to 100 per cent of the sales were on credit. With these high-income families, telephone ordering was frequent. On the other hand, delivery service was less common. None of the stores in the rural areas reported offering delivery service. This, too, was a service for high-income families.

A large proportion of total retail store sales was in canned goods and staples, and purchases at food stores were supplemented by shopping at the *plazas mercado* (old Spanish-style central market places) and by buying from street vendors. Sales per employee, as well as per customer, were low for most food stores. Finally, the greater number of stores contributed to the slow turnover of goods for the individual store. Entry into the food business was relatively easy because wholesalers provided credit.

In 1950, a retailer who purchased a given line of commodities from three or less suppliers was considered by Galbraith and Holton to have "few suppliers." A store with a complete line (staples, canned goods, fruits and vegetables, and meats) could have as many as 12 suppliers and still be considered to have "few" suppliers according to the classification in the Galbraith and Holton study. Most retailers purchased from more than 12 wholesalers.

Food retailers in 1950 had very much of a "live and let live" philosophy. There was no advertising. There were no special price sales. Food store operators believed that the market was of fixed size and that if they advertised or cut prices they would only hurt themselves and/or their friends who operated other food stores.

Detailed estimates of expenses were obtained in 1950 by Branson from 229 retail stores. A summary of those data is shown in Table 3-2. Because of the lack of accounting information among small stores, the sub-sample of 229 was biased toward the larger stores. More specifically, the average annual sales reported in the special survey were $32,376. The distribution was highly skewed, and 95 percent of the firms sold less than $24,000 annually. Table 3-2 shows little difference in gross margins among stores of differing sizes, but net profit for the larger stores was double that of the smaller stores. Selling costs and rent were lower for the larger stores. *The Agricultural Report* by Nathan Koenig (1953) completed a report on agriculture. Koenig told

Table 3-2.—Gross and net margins and operating expense ratios for retail food stores, by sales class, 1949, Puerto Rico

	Annual sales (dollars)						
From to Less than	0 6,000	6,000 12,000	12,000 24,000	24,000 48,000	48,000 120,000	120,000 480,000	Average
Number of Stores	35	44	68	39	33	10	
Gross margin	21.25	25.63	25.00	21.59	22.71	23.35	23.11
Net margin	7.54	12.31	12.32	11.10	14.31	15.26	14.6
Total expenses	13.71	13.32	11.69	10.49	8.4	8.09	9.51
Rent & utilities	5.55	3.89	2.61	1.91	1.45	1.57	1.78
Taxes	0.50	0.65	0.33	0.21	0.17	0.30	0.27
Equipment expense	.90	1.04	.95	.76	.55	.50	.66
Supplies	.10	1.39	1.22	.71	.50	.45	.68
Insurance		0.02	0.08	.05	.09	.08	.07
Stock loss	0.90	.88	.63	.51	.42	.20	.43
Selling costs	4.30	3.30	2.46	2.09	1.43	1.24	1.79
Buying cost	0.44	0.92	0.66	0.65	0.65	0.34	0.56
Labor	.43	1.50	2.78	3.58	3.14	3.40	3.12

Source

Galbraith, John K., and Richard H. Holton. (1954) *Marketing Efficiency in Puerto Rico.* Harvard University Press, p. 31.

how virtually all the fruits and vegetables moving to urban centers in Puerto Rico were purchased by itinerant truckers on the farm or at concentration points along the highway. Koenig observed that:

> The movement of products from the farms to the marketing centers of Puerto Rico is a costly process... All the fruits and many other products that move in the market are sold by count. Although some of the products are placed in sacks, their handling is as costly as handling bulk shipments. Since there is no grading to promote buyer confidence, the practice of the trade is to inspect each item that is received. (Koenig, 1953, p. 221)

The most prevalent sources of market price and supply information were market observation and word-of-mouth reporting. The merchant truckers obtained price information by direct observation in the various market plazas they visited.

Marketing of meat, like the marketing of fruit and vegetables, was similarly primitive. Low volume by a large number of dealers, operating under poor conditions, resulted in high costs. In addition, sanitary precautions were practically non-existent.

Egg production and marketing were similar. Production was widely scattered among a large number of subsistence farms and there were no grading or handling regulations. The result was an uncoordinated and apparently inefficient marketing system, which involved a high degree of risk for all concerned. Due to the lack of large-scale commercial egg producers, there were large numbers of egg dealers who collected eggs and either retailed them directly or sold them to other retailers for sale to consumers. Then, too, consumers were confronted with fluctuating egg prices. As a result of the risk and inefficiencies mentioned above, Puerto Rican consumers continued to purchase large quantities of imported eggs, which were also of low quality due to the lengthy transport time and handling conditions typical in the shipment of perishable goods.

Dairying had developed as second to sugar in dollar volume by 1950. In the forties, strides had been made in increasing production and eliminating diseases of cattle, but processing and distribution hampered the improvements in milk production. Of the 159 million quarts produced, only about 56.5 million quarts entered commercial sales channels. There were no regulations on milk prices; producers and their buyers were completely free to bargain and establish milk prices throughout the year. As a result of inefficiencies in marketing, Puerto Ricans imported and consumed almost as much milk in the form of evaporated and dry milk as was produced and processed for local consumption.

Summary

Food distribution in 1950 was a conglomeration of many problems. There were small farmers at the mercy of fluctuating prices. There were many small retailers, few of whom were operating at efficient levels. And there were great quantities of food imported from the mainland. Basically, the situation was characterized by great uncertainty, resulting from a lack of quality grading practices and/or government regulations. A few attempts had been made to improve the distribution system, but they had not been effective overall. Real changes were needed, and the commonwealth government, under Muñoz-Marin's leadership, set to work to bring about those changes.

IV. A TIME FOR CHANGE

Following the publication of *Marketing Efficiency in Puerto Rico* and *A Comprehensive Agricultural Program for Puerto Rico*, Governor Muñoz-Marin appointed the Food Commission which he had first promised in 1940.* This was a shrewd political step on the governor's part, because it brought into the decision-making process people who could have effectively blocked the proposed changes. At about the same time the Food Commission was appointed, the governor announced that food prices had continued to be too high, just as he had noted they were in 1940.

The stated purpose of the commission was to evaluate the findings of the economic studies and make recommendations for implementing the proposals. Muñoz-Marin's unstated purpose was to bring the affected parties together; those who might have objected to reform and who might have sabotaged the efforts to bring about change found themselves serving as members of the commission. Thus, the governor was assured that all commission members were publicly committed to support any government-sponsored reform program, since any reform would be based on their recommendations—unless dissident

* The Commission was composed of respected persons from the University of Puerto Rico, the government, and both the United States and Puerto Rican business communities. Lansing Shields, the president of Grand Union Supermarkets, was chairman of the Commission. Other members included: Frank Ballester, Frank Besosa, Maurice C. Bond, Ramon Colon-Torres, William Crow, Hugh J. Davern, Francisco Frieria, J. K. Galbraith, Millard Hansen, Bretton Harris, Austin Iglehart, William G. Karnes, James McGowan, Jr., Candido Oliveras, John Paton, Beardsley Ruml, Charles F. Seabrook, Ramon Seneriz, and Francis Whitmarsh.

members broke from the majority and offered minority recommendations. The groundwork had been carefully laid to prevent that.

In April, 1954, the governor's Food Commission made its report. In it, the members unanimously agreed with most of the suggestions made by the various studies. The committee recommended the following actions:

1. The establishment of supermarkets in urban areas.
2. Consumer cooperative retail units for rural areas. A federation of these retailers' cooperatives was recommended to form a wholesale warehouse in the San Juan metropolitan area.
3. Government assistance in building and site selection to help local businessmen who wanted to establish new stores. (The emphasis throughout the commission's report was on aid to local Puerto Rican businessmen.)
4. A tax incentive for food processors.
5. The expansion of agricultural production with stress on import substitution.
6. An intensive training program for food store employees and consumers.

The Responsibilities of the Various Government Agencies

After the governor's Food Commission report was made public, some concern arose over which agency would be responsible for implementing the recommendation. The seemingly most appropriate department, Agriculture and Commerce, was at that time much more concerned with social programs and with trying to improve rural living conditions. Fomento resolved the problem within the industrial development branch of Fomento. As the reader will recall, Fomento initially took the responsibility to help industrial development and then it was discovered that indigenous management for the industrial development program was in short supply. As a result, management was being hired from the United States mainland, and some of the mainland wives were not happy with shopping facilities in Puerto Rico. In an interview with one of the authors in 1966 Theodoro Moscoso (former head of Fomento) stated that one of the initial reasons Fomento entered the field of food distribution was to provide "continentals" with supermarkets so that they would find working in Puerto Rico more pleasant.

E. Lee Feller, a young man from Michigan, was the first director of the food distribution program within Fomento. The primary work of the department was to teach owners and operators how to modernize and convert to self-service operations, and to instruct and train em-

ployees to handle perishables and meat. In July, 1956, a formal food distribution program was initiated. In 1957 the Office of Food Distribution was replaced by the Commercial Development Department and the area of involvement was expanded.

Meanwhile in the late fifties the Department of Agriculture worked for better commodity grading, standards, and market information. The Department of Agriculture took the responsibility for the development of the Central Market, the food wholesaling complex which had been first recommended in the early fifties. The department made additional studies but no firm steps were taken to establish a central market for more efficient handling of food until the Department of Commerce was established in 1961.

The programs of Fomento's Office of Commercial Development involved the establishment of supermarkets and shopping centers. As a result of these actions on the part of Fomento, some Puerto Rican businessmen came under new and intense competition. Some businessmen felt it would be impossible to stay in business without the help of a government agency. In response to requests by individual businessmen and their associations, a law was passed in July, 1960, creating a separate Department of Commerce from elements in Fomento and the Department of Agriculture and Commerce. The newly created Department of Commerce began giving service in August 1961. The law specifically provided that the Department encourage effective competition so that the distribution system would be favorable for the consumer as well as the retailer or wholesaler. The Division of Financial Service within the Department assisted businessmen to secure loans. The Division of Technical and Commercial Development helped more than 5,000 businessmen modernize their businesses in the first four years of operation. In addition, management training programs and seminars that had been established earlier by Fomento were continued.

The Commercial Development Company

Closely related to the aforementioned government agencies was the Commercial Development Company (CDC). This company was created by the Commonwealth Legislature in June 1966 at the urging of the then Secretary of Commerce, Dr. Carlos Lastra. The company's job was to facilitate sufficient commercial facility investments on the island.

The Commercial Development Company handled the financing and construction of the new central market in Puerto Nuevo. A recent major project of CDC was the construction of the Central Market for food wholesalers at a cost of $1,872,360. Presently, there are two warehouses providing 358,000 square feet. In 1966 CDC allowed contracts for the construction of an additional 350,000 square feet of warehouse space.

The Commercial Development Company is involved with the Department of Agriculture and the various municipal governments in the construction of a modern *plaza de mercados* and commercial centers. The company also is authorized to make loans to private businessmen for bettering commercial facilities in Puerto Rico. Finally, CDC began a program for guaranteeing rents of small and medium-size businesses in shopping centers.

Fomento

Fomento led the government efforts to bring about the changes in food retailing suggested by the Food Commission. Fomento had funds to help establish supermarkets; it helped the cooperative stores form a large centralized wholesaling operation through both financial and technical assistance; it encouraged the establishment of a voluntary group of independently owned food stores; and it provided training for employees and technical assistance for those retailers who wanted to modernize their stores and/or management. These several avenues of change were tried in the hope of fostering a balanced competitive scene in the hope that some innovations would succeed even if others failed.

Fomento also took the responsibility of encouraging supermarket development and approached certain San Juan food wholesalers about the possibility of establishing such stores. The government was willing to match private businessmen dollar for dollar in the establishment of supermarkets. Certain wholesalers in the larger metropolitan areas were asked to participate. Certain retailers were asked to participate. Representatives of all segments of the food distribution system community were offered assistance in the creation of supermarkets. However, none of the businessmen in food retailing or wholesaling accepted help at that time on the terms offered.

There are those today who ruefully admit that perhaps they should have accepted Fomento's offer of help. There are also government officials who wish that somehow more effort could have been put into encouraging local retailers to change their way of doing business.

It was the outsiders who were the first to accept the risks of establishing supermarkets, first in San Juan and later in the other urban areas of Puerto Rico. There were, in 1954, a few locally operated supermarkets, but they were not doing well. A locally owned chain of four stores with the latest equipment had failed in the mid-fifties. One of the more successful local operators refused Fomento's help in expanding his operations. A stateside firm, Todos, a division of the Rockefeller-sponsored International Basic Economy Corporation (IBEC), agreed to a government request to start supermarket operations in Puerto Rico. By 1958, Todos was having financial difficulties, allegedly

due to inexperienced management. Grand Union, whose president, Lansing Shields, had been president of the Food Commission in 1954, purchased the Todos Supermarkets. It is said that Grand Union's entry was requested by government officials to insure meaningful competition for other private operators. Nevertheless, it was Grand Union that received the bad publicity in 1961 when intense opposition developed to supermarkets extending their operations outside of San Juan. Grand Union was forced to forego investments in Fajardo and Arecibo, two cities about 45 minutes drive from San Juan. Both of these cities were forecast to enjoy rapid growth. The "invasion of foreign corporations" was heatedly discussed in 1961 on the floor of the legislature. The speaker of the house, Ernesto Ramos Antonini, led the fight against the establishment of supermarkets outside of San Juan, and Grand Union consequently suffered a delay in growth.

In contrast to the problems of Grand Union, "Puerto Rico and Pueblo are growing together," just as currently advertised. Pueblo supermarkets did not have the political problems of Grand Union, perhaps because the company was viewed as a Puerto Rican operation from its inception. Pueblo supermarkets got their start from an *extranjero*, Harold Toppel, who opened his first store in the spring of 1954 without any help from Fomento. He did not receive Fomento's help because he was not a local businessman for whom these funds had been set up. Many of the wholesalers refused to work with him because he was not Puerto Rican. But Fomento encouraged him, particularly after his second store was established.* Toppel was a hard-driving, result-oriented executive with sound business sense. He believed the Puerto Rican government was and is "clean and honest" and the political climate was conducive to business growth. In Puerto Rico, he considers himself Puerto Rican, and evidence of that belief is the name Pueblo, its slogan "*Puerto Rico y Pueblo Progresan Juntos*," and its employees who are nearly all Puerto Rican. He has hired and trained local people, and in many cases promoted them to executive posts. His trust in Puerto Rico has been returned; Pueblo in 1965 sold more food than its next two closest competitors combined. The Pueblo Supermarket Cor-

* That an outsider was the one to establish what became the most successful food retailing chain is an indication of the openness of Puerto Rico's political climate. The *extranjero*, the foreigner, made truly significant contributions to the changes in food retailing in Puerto Rico. But these contributions would not have been possible had the pragmatic and result-oriented Puerto Rican leaders not set up an atmosphere of permissiveness and encouragement. This atmosphere was one of encouragement for anything that looked as if it might work. Fomento's help perhaps was a necessary, but certainly not a sufficient, condition for growth. The primary reason for Pueblo's success is due to its founder, Mr. Harold Toppel, an outstanding example of the successful *extranjero*.

poration made a total net profit of $1,829,544 from its founding in 1956 through January 31, 1960. All that profit was retained in Puerto Rico and reinvested in the food retailing business. Since 1960, dividends to common stockholders have approximated 30 percent of annual earnings. The remainder has been reinvested, mostly in Puerto Rico. The 1961 drive to keep "foreign dominated" firms out of the smaller cities of the island, and probably also to slow their rapid growth in San Juan, did not visibly affect Pueblo, which concentrated most of its efforts in San Juan until 1964.

COOPERATIVE STORES. Fomento provided a loan to help the food retail cooperatives build a food wholesale warehouse. The new food wholesale firm, the Federation of Consumer Cooperatives, was supposed to provide products at a lower cost to both member stores and other food retailers who were too small to have their own warehouses. While cooperative food stores' sales have increased over the years, the growth has not been steady. The cooperative food wholesaling operation has failed to be an effective competitor with the privately owned food store.

Perhaps the cooperatives were not a success because they were a potential threat to the existing and profitable wholesaler-importers. Some of the wealthiest and most influential families in Puerto Rico were owners of the food wholesaling-importing firms. These food brokers-importers-wholesalers were extending credit, dealing in commodity speculation, and permitting retailers to perform the warehousing function on credit. The cooperative wholesale operation found it difficult to buy the products it needed at what it considered proper prices. Then, too, the cooperative warehouse found the traditional suppliers of the stores making special deals in order to hold their customers.

One of the most successful cooperative stores was in the western city of Mayaguez, where faculty members of the University made significant contributions to the guidance of that store and its growth. The university community probably made that cooperative a success. Until late 1965, it was the only supermarket in Mayaguez.

INDEPENDENT STORES, INCORPORATED. From the beginning of its food distribution program, Fomento supported the creation of a buying group of small retailers called the Independent Stores, Inc. (ISI). The group began with 15 merchants located in various parts of the San Juan metropolitan area; each member contributed $1500 to the organization. Some members were sent to observe similar operations in the United States. Tentative financing arrangements were made with local banks and also with the Government Development Bank.

Financing for expansion proved a real problem because the operators did not have such things as operating statements for a two or three-year period. They had no such comprehensive records. Even the Government Development Bank would not accept loan applications without adequate financial records. The bankers had many alternative outlets for profitable loans in the booming Puerto Rican economy. They did not feel it necessary or desirable to loan money to "high risk clients." Through programs such as ISI, Fomento tried to "get the retailers out of hock to their suppliers, get them out of credit sales, and then upgrade the stores to self-service."* In the late fifties, ISI failed because of the lack of aggressive group spirit. The technical advice and management training programs continued for individuals.

Agricultural Planning

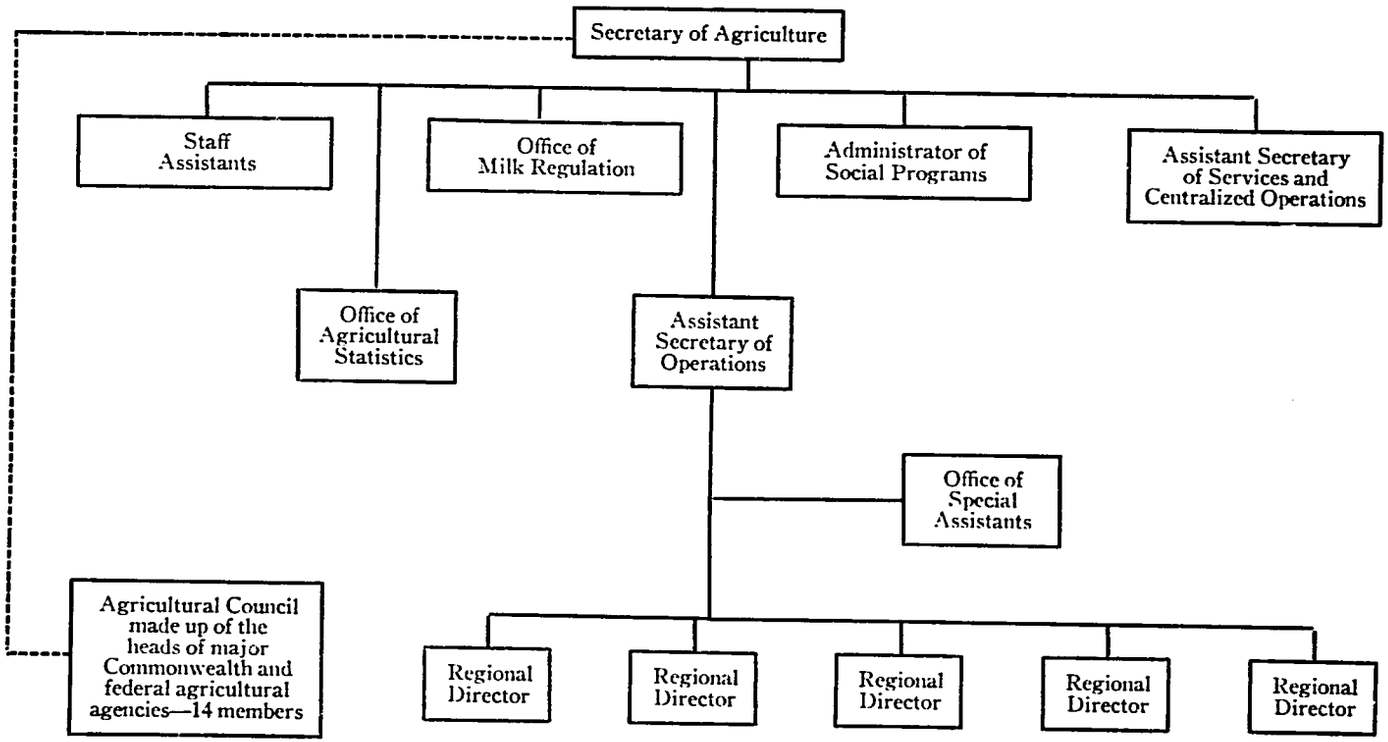
In 1960 the Rockefeller Foundation sponsored a study by Mr. Guillermo Irizarry in which he proposed a new plan of organization and operation for the Puerto Rican Department of Agriculture and related agricultural agencies. (Irizarry, 1961) In his report he recommended that the Secretary of Agriculture divide the island into five regions, each with a resident agricultural director to coordinate all agricultural programs in that geographical region. Such decentralization he argued, would permit greater emphasis on coordinated efforts of all agricultural agencies in each region of the island toward the solution of pressing agricultural problems. The reorganization recommended by Irizarry was adopted by the government of Puerto Rico. An outline of the present organization of the Department of Agriculture is shown in Figure 4-2. All island-wide services such as disease control, market regulations, and crop insurance are headed either by an individual reporting directly to the Secretary or by the Assistant Secretary of Services and Centralized Operations. All programs pertaining to agricultural development in a given geographical area are under the auspices of the specific regional director and the Assistant Secretary of Operations.

The Assistant Secretary of Operations supervises specialists in individual areas such as marketing and production. These specialists are asked to work closely with regional directors in developing programs that will contribute to the region's agricultural development.

The responsibility of each regional director is to coordinate the work of all agricultural agencies in his region (including semi-autonomous commonwealth agencies and autonomous federal agencies).

* Explained in personal interview between the authors and Mr. Don Lemmons, long term consultant to the Puerto Rican government.

Figure 4.2.—Organization Chart for the Puerto Rican Department of Agriculture



The objective is to see that these agencies are working together without duplication and dissension toward more efficient agricultural production in the region. To accomplish the job, each director has a coordinating committee made up of the appropriate heads of all agricultural agencies in his region. Through this committee the regional director is theoretically able to mobilize, toward a common cause, the resources of the Department of Agriculture, the Agricultural Extension Service, the Agricultural Experiment Station, Vocational Agriculture workers, the Soil Conservation Service, the agricultural credit agencies, and any other agricultural agencies operating in his region. The logic of such an approach is that each of the agricultural agencies has contributions to make and that a coordination of their efforts will provide mutual help among the agencies, avoid duplication, and increase the over-all efficiency and effectiveness of their agricultural development activities.

One of the first duties of each regional director after the department's reorganization was to make a comprehensive development plan for his region. In order to prepare such a plan, each regional director conducted an inventory of all farms in his region. That information was tabulated and used to indicate the existing structure and problems of the farmers. Employing that data, the director and his staff were able to move ahead with the identification of specific farm problems and the formulation of a broad regional plan for attacking these problems. In 1966 two of the five regional plans had been completed.

The Mayaguez region was the first to complete a development plan and has generally served as the pilot region for the new approach. In this region short-term objectives have been established to be used in achieving the long-range goals. In most cases objectives are specific enough that each agricultural agent in the region has certain objectives to be achieved during the year. The objective may be to work with a certain specific group of farmers to encourage them to improve drainage, to adopt a new sugar cane variety, or to join a marketing cooperative. Thus, duplication of effort is avoided and a direct line of responsibility is established to achieve regional goals aimed at improvement of agricultural productivity.

Cooperative Development

Cooperation among farmers and sugar cane workers existed in Puerto Rico before 1900. However, cooperatives did not become important in the economy until after 1920. In that year a law was approved in the legislature to facilitate the organization and operation of consumer and producer cooperatives. The usual tax exemptions approved under the law provided the cooperative followed the rules of one member-

one vote, return of profits to members on a patronage basis, and less than 50 percent of total business carried on with nonmembers.

Between 1920 and 1945, the cooperative movement expanded rapidly, especially among farmers. During the period, several large cooperatives were organized which still remain a potent force in the agricultural economy (e.g., a coffee marketing and supply cooperative, a tobacco marketing cooperative, and two cooperative sugar mills). The Agricultural Extension Service was quite active during this period in assisting farmers to organize and operate cooperative enterprises.

A visit by Father Joseph McDonald, one of the cooperative leaders in Nova Scotia, to the Catholic University in Ponce started a move that completely altered the nature of cooperativism in Puerto Rico. His philosophy of cooperativism was that it should serve not only as a tool of economic improvement but as a tool of social reform. (Valcarcel, no date) This philosophy was soon accepted by other cooperative leaders on the island, partially as a result of a series of seminars given by Father McDonald at the University of Puerto Rico in the summer of 1945. Moreover, the philosophy infiltrated political circles through a personal dialogue between Father McDonald and Luis Muñoz-Marin, then President of the Senate of Puerto Rico. As a result of that conversation, a Senate committee was appointed to travel to Nova Scotia to study its cooperative movement. The committee was asked to make recommendaions to improve the laws and policies governing cooperatives in Puerto Rico.

The committee recommended that the legislature approve a new law which would provide for: (1) the organization of credit cooperatives; (2) the creation of a Department of Cooperatives in charge of assisting in the organization of cooperatives and promoting cooperative education; (3) the development of a curriculum for cooperative education in the University of Puerto Rico and in public schools; and (4) the creation of a credit agency for cooperatives.

The proposed law was enacted in 1947 and reflected a new cooperative philosophy on the island. The Department of Cooperatives was given the task of promoting cooperative development and providing cooperative education. After the law was passed, there was a great deal more emphasis on the social objectives of cooperatives than had been evidenced before.

In 1967, when Fomento Cooperativo was created as the high level government agency responsible for the intensification of the cooperative movement, the philosophy of social reform carried over to this new agency.

Significant growth has occurred since 1947 among credit, consumer, and housing cooperatives. In 1962 there were 255 credit unions, 92 con-

sumer cooperatives, and 34 housing cooperatives on the island. Membership in these cooperatives had grown rapidly to over 100,000. On the other hand, agricultural cooperatives experienced very little growth after 1945. In 1962 there were 29 agricultural cooperatives with about 42,000 members. This represents about 13 percent of the island's rural population.

In recent years there has been a new government emphasis on cooperative development. A new administrator was appointed for Fomento Cooperativo in 1965 and he expressed interest in boosting the number and quality of agricultural cooperatives. The Federal Agricultural Extension Service, Puerto Rico Agricultural Extension Service, Cooperative League of Puerto Rico, and Fomento Cooperativo in 1966 were cooperatively developing an intensive educational program for cooperative members and leaders. The emphasis was upon modern management techniques for effective cooperative business firms.

In general, cooperatives have received a great deal of interest and political support in Puerto Rico and from 1945 to 1965 the primary emphasis was on using them as a tool of social reform with secondary emphasis on economic benefits. Since 1965 some efforts have been made to reverse the earlier philosophy and place additional emphasis on the economic benefits of well managed cooperative businesses.

Interaction Between Changes in Food Retailing and the Government

The government interest in improved distribution systems, while intense and in many ways helpful, was not an unmitigated blessing to the local businessmen. While Fomento, the Department of Commerce, and the Department of Agriculture did much to encourage larger and more efficient retail establishments, the Planning Board, the Department of Agriculture, and the Department of Justice were involved in less helpful decisions regarding food retailing. Retail establishments, like other institutions, operate in a society which is significantly affected by rules and sanctions laid down by different levels of government.

Planning Board Regulations

As mentioned earlier, there has been a Government Planning Board in Puerto Rico since 1942. The Planning Board has been intimately concerned with all major economic events on the island. The 1962 edition of the Planning Board regulations, governing the development of new suburban shopping centers, specifically decrees what stores, including food stores, will be in various neighborhood shopping centers. Further, the Planning Board specifies the minimum sizes of these

stores under the title "Construction of Commercial Facilities." The quotation below is a translation of part of their regulations:

> Commercial facilities will be constructed on the basis of roughly a minimum area of 15 square feet per dwelling or lot. These buildings can have roughly a maximum area of 25 square feet per dwelling or lot. The developers will justify the size. As a part of the minimum commercial facilities required, space shall be provided for grocery stores, pharmacies, doctors' offices, cafeterias, hardware stores, laundromats, bakeries, according to the minimum size that is established in the Appendix of this regulation. The other uses pointed out in the Appendix are optional. But this statement does not relieve the developer from providing the minimum rough area of floor for the stores specifically required. The contractor or developer shall prepare the floor plans with the distribution and use of all space for all the buildings that are projected to be utilized for commercial means. In the development of subdivisions, the board shall submit to the Department of Commerce for its endorsement. (Junta de Planificacion, 1962, p. 13)

Since the construction company must build and pay for the neighborhood shopping center, this specific requirement for stores within each development has been met usually with the minimum-size stores specified. Many of the resulting food stores are too large to be run by one employee but too small to compete adequately with the large supermarkets in terms of varieties of merchandise carried.

Then, too, in the more settled neighborhoods, private entrepreneurs have disregarded the dictates of government regulatory agencies by constructing small food stores within houses. There are many of these so-called "clandestine stores" in the suburbs around San Juan. In many cases, without Planning Board approval and in competition with the shopping center stores, garages are being remodeled to form small stores. Competing with these stores and frequently located in the open areas between suburbs, large supermarkets of 15,000 or more square feet have been constructed. The food store operators in the authorized Planning Board stores of the suburbs are forced to compete with the "mom and pop" stores in the homes and with the larger supermarkets outside the suburbs. They are poorly equipped to do either job very well.

Many of these Planning Board-sponsored stores seem today to be of the wrong size. The larger stores have greater assortment and, therefore, can change their "mix" of products in such a way as to charge lower prices for necessities. On the other hand, the clandestine stores, since they are owned and operated by the same person, are permitted to set their own hours and days of operation. All retail establishments

that employ workers must close at 6 p.m. every night except Friday, when they may remain open until 9 p.m. In addition, any retail store that employs workers is not permitted to be open on Sundays.

The Department of Agriculture

The Department of Agriculture tried to help Puerto Rican farmers and consumers by establishing grading requirements for incoming produce. The requirements, some of which were established back in 1957, effectively cut off imports of tropical starchy vegetables such as plantains, bananas, and root crops. Retailers must also note the origins of eggs, chickens, and other forms of meat. Thus, these products also are more difficult to bring from other areas. Such restrictions have probably resulted in higher prices of certain commodities.

Anti-Trust Laws

As early as 1954, Galbraith and Holton warned that the exclusive agency arrangements which many mainland food processors had with importers in Puerto Rico might be illegal in terms of the United States' Robinson-Pattman Act. The result of these arrangements was that no competition existed for most name brand goods.

> Certain practices of the exclusive agents and their principals are conceivably, though not certainly, illegal under the Robinson-Pattman amendment to the Clayton Act. (Galbraith and Holton, 1954, p. 194)

Galbraith and Holton went on to suggest that legal changes to the exclusive agent arrangement either by the Commonwealth Government or the Federal Government probably was not the answer. They specified the question, "What will be the effect? Will the resulting changes in distribution methods really effect a reduction in costs or will the income now enjoyed by the agents simply be shunted into other hands?"

For years, no official action was taken. But in 1964 and 1965 two new anti-trust laws were enacted. The new Puerto Rican anti-trust laws are starting to be applied, but as yet are not much of a force in the market place. The two laws seem to be at cross purposes with each other. Puerto Rico's unique broker law (Law #75) is a law which seems to protect vested interests. The main provisions are that a principal (processor or manufacturer) may not change his agent without giving the agent rewards for the future stream of revenue under the presumption that these revenues are a result of prior effort of the agent on behalf of the principal. Perhaps because it has not really been tested yet, it stands now as a structural constraint which perhaps prevents certain small reforms in marketing which might otherwise have been made by individual businessmen. Law #77 is patterned after the U.S. anti-trust laws and is designed to prevent monopolies.

Another confusing legal situation is that the United States anti-trust laws are seemingly held in abeyance, especially with respect to the wholesale sector. At present the larger retailers may buy either from the local wholesaler-distributor located on the island or from mainland wholesalers, which sometimes means differences in prices, because some processors sell as if Puerto Rico is an export market. If the processor or manufacturer wants to change his arrangements, he faces a dilemma. If he accepts the fact that Puerto Rico is part of the United States territory and sells directly to a retailer, bypassing his agent, his prior relationship with the agent who represented him is threatened by the local brokerage law. On the other hand, if the local wholesaler-importer acts as a broker, then the United States processor is subject to question either under federal or local law, if there are differences in price or if the differences in price do not fully allow for quantity and services and differences in order size.

The other Puerto Rican anti-trust law is patterned after the Robinson-Pattman Amendment and Clayton Act. It prohibits price discrimination (Law #77). It also provides for establishment of an Office of Monopolistic Affairs. This office can conduct Federal Trade Commission type hearings. As of May 1966, the office was operating with a limited staff and taking action only as complaints came in.

Co-op Laws

Law #291, entitled "General Law of Cooperative Societies of Puerto Rico," was approved by the Puerto Rican legislature on April 9, 1946, and has been the basis on which all cooperatives operate. The law specifically spells out who can form cooperatives and the tax benefits provided. Article 5 says that a cooperative can be formed by a group of 11 or more "consumers" or "producers." Thus, retailers are not permitted to form a cooperative buying group such as Associated Grocers in the United States. This puts medium-size, progressive, independent businessmen at a possible disadvantage since they cannot form a buying group.

The law does, however, permit a cooperative to make up to 49 percent of its sales to nonmembers. In fact, the Cooperative Federation, the wholesale warehouse arm of the cooperative food stores, does supply independent retail operators.

The federation was begun when the consumer cooperatives were reorganized in 1956 with the help of Fomento and the Agricultural Extension Service. A federation of these cooperatives was established for serving as wholesaler to the retail cooperative stores. Fomento loaned the federation a substantial amount of money to help it get started. Among probable reasons for Fomento's encouragement of the

co-ops were: (1) to implement Food Commission recommendations that food cooperatives should be given a hand; (2) to encourage some countervailing force for such private supermarkets that were being established; and (3) to act as a political device to prove to critics that the government had not sold out to private industry.

Resulting Additional Investment in Food Retailing

Investment in Puerto Rico looked much more promising in the early sixties than it did in the mid-fifties. Some new firms had been attracted into food retailing by the high profits of the more efficient operators.

A new discount house with a large supermarket was established in San Juan in late 1964. While the supermarket operation was mainly owned by Continentals, the day-to-day operations of "Supermarcados de Discuentos de Puerto Rico" were managed by Puerto Ricans. A local image was created, and a stateside buying office provided purchasing assistance. By mid-1966, this company had three stores in operation and plans for others. Their initial entry had been very successful.

Summary

There are several threads which could be considered basic to the changes that occurred in Puerto Rican food marketing between 1950 and 1965, but the interest and attention of one man, Luis Muñoz-Marin, stands out. Privately and publicly, he strongly supported food distribution reforms. He had the political shrewdness and courage to move forward with potentially dangerous reforms, which would hurt some businessmen. He had the willingness to trust and listen to intellectuals and technicians who showed him how to accomplish reform.

During 1949 and 1950, intensive studies were made of the state of food production and distribution throughout the island of Puerto Rico. These studies resulted in the governor appointing a Food Commission. The commission, which had been a political promise since 1940, recommended the implementation of a number of reforms that had been suggested by the earlier economic studies.

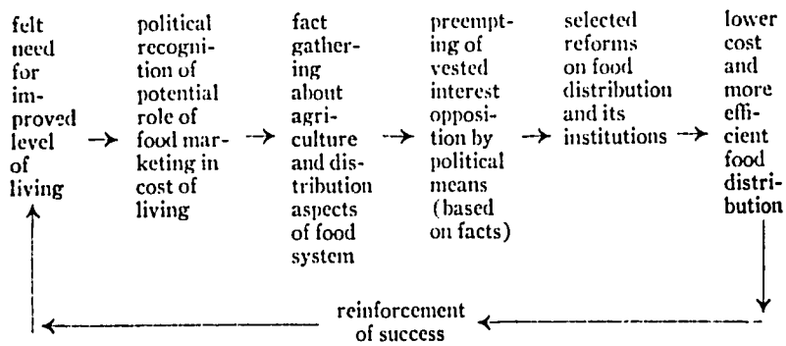
The Economic Development Administration, better known as Fomento in Puerto Rico, took the responsibility for putting to work the Food Commission's recommendations. Fomento's primary efforts were directed toward encouraging local businessmen in new methods and types of stores. Primarily, though, the more successful change agents were newcomers to food distribution in Puerto Rico. There was too much risk in these new ideas for most of the existing operations. The most successful programs of change were with the large supermarkets. The interest of other government departments, while fairly extensive,

was not an unmitigated blessing as indicated by the Planning Board regulations.

Another contributing factor to the ease with which change was introduced was the rapid growth in the total economy and in family incomes. There was, during these years a five percent plus growth rate, which meant there was more for almost everyone. The higher incomes meant that consumers were ready to buy new products which the retailer could introduce. Thus the retailer gained dominance over the distribution channel.

Below is a paradigm of accelerated change in food distribution which can result in increased development. (It is believed that this paradigm, while it is one way of understanding what happened, is not unique to Puerto Rican food distribution.)

The diagram is a concentrated way of laying out the manner it was perceived that food distribution could change and, as part of its change, contribute to economic development. It should be kept in mind that even though neither the time period nor the feedback loops are specified in the paradigm, in the view of the authors they do exist and influence the results. In chapter eight some attention will be given to an explanation of the effect of improvements in food distribution on economic development and the dynamic interactions producing those beneficial effects over time.



V. THE RESULTS: RETAILING

One major change in the Puerto Rican economic picture from 1950 to 1965 was the increase in family income. Money coming to the Puerto Rican family increased 145 percent, compared to the United States average of 63 percent during the same period. And yet many Puerto Ricans were still poor. The 1959 median family income in Puerto Rico was less than one-half the median income of the poorest state in the United States, Mississippi ($2,844). As shown in Table 5-1, the United States as a whole, as well as Mississippi and Puerto Rico, have shown

Table 5-1.—Income distribution of spending units, Puerto Rico (1949 and 1959)

Income, dollars (current prices)	Percentage of spending units, 1949	Percentage of families, 1959
Under 1,000	74	42.4
1,000-1,999	16	23.5
2,000-2,999	5	12.9
3,000-3,999	2	7.0
4,000-4,999	1	4.4
5,000-7,499	....	7.2
7,500-9,999	2	....
10,000, or over	....	2.1
Not reported	....	0.6

Sources
G&H Marketing Efficiency in Puerto Rico, p. 6, Table 1.
Statistical Abstract of the United States, p. 341, Table 46.
U. S., *Census of Population, 1960, Mississippi*, pp. 26-134, Table 66.
Family Income, p. 390, Table 119.
U. S., *Census of Population, 1960*, PC(1)-53C, Table 57, p. 129.

increases in income. However, it is evident that Puerto Rican families in 1959 were just about where Mississippi families were ten years earlier. As late as 1959, 44 percent of the island families had incomes of less than $1,000.

Table 5-2 shows the changes for the United States as a whole, Mississippi, and Puerto Rico over the ten-year period indicated. It can be seen that family incomes in both Mississppi and Puerto Rico increased faster than the rest of the United States. It can also be seen in Table 5-2 that while Puerto Rico has made great strides in the 1950's, its percentage change in median family incomes was not greatly different from the rate of changes in the median income of Mississippi families.

Table 5-2.—Comparisons of current $ incomes, median family incomes, United States, Mississippi, and Puerto Rico, 1949 and 1959

Median income	United States		Mississippi		Puerto Rico	
	1949	1959	1949	1959	1949	1959
	$3319	$5417	$1228	$2844	$534	$1268
As % of U. S.	100%		37%	52%	16%	23%
% change, based on 1949	63%		.....	132%	.....	145%
% change, based on 1959	39%		.....	57%	.....	59%

Source
Calculations from Table 5-1.

There are, however, indications that the rate of change of Puerto Rican family incomes has accelerated since 1959. By 1963, the Puerto Rican median family income was estimated to be $1856.* Another indication of the rapidly increasing income is the results found in a survey of families in San Juan and Mayaguez. While the distribution in the two cities is different, it is obvious that this is a considerable improvement over that reported in the 1959 census, as indicated in Table 5-1.

According to this survey, less than 30 percent of the families were in the lowest income bracket, as opposed to 44 percent in 1959. Although median income cannot be determined precisely, it is in the $2000-$3499 range in both San Juan and Mayaguez.

One must admit that the minimum income necessary for survival is undoubtedly less in Puerto Rico, where there is a year-round tem-

* This was derived from Planning Board estimate of 1964 mean family income of $4244, and by using the same percentage relationship as existed between 1959 median and 1960 mean incomes. At that time, median income was 44 percent of mean income.

Table 5-3.—Family income before taxes, 1964, by income classes, San Juan and Mayaguez

Income	Percentage of families	
	San Juan	Mayaguez
Less than $1,000	27.4	21.6
$1,000-1,999	17.41	20.9
$2,000-3,499	20.00	29.8
$3,500-4,999	13.0	14.9
$5,000-9,999	13.9	11.2
$10,000 or more	8.71	1.4
	N = 230	134

Source
Latin American Food Marketing Study, 1965-66.

perature above 70°F. and heavy clothing is unnecessary. Not even Mississipians can claim a climate like that. Still it may be that it costs more to maintain any given standard of living in Puerto Rico because of higher prices. (That issue will be dealt with in a later section.)

Population Change

For a variety of reasons, including a common citizenship, travel is fast and economical between the United States and Puerto Rico. The traffic has been especially heavy between New York City and Puerto Rico. In mid 1966 the air fare of $45 one way for the 1,603 miles between New York and San Juan was one of the lowest in the world. One is told stories, apocraphyl perhaps, of hard selling travel agents who worked the rural areas (where unemployment was especially high during the fifties) selling one-way air tickets on the installment plan to New York. The Puerto Rican-born population of New York City tripled between 1940 and 1950 and increased from 187,420 to 429,710 between 1950 and 1960. By 1960, there were 615,384 Puerto Rican-born persons living in the continental United States. (U. S. Bureau of Census, 1960, p. 7)

Because of the heavy migration, the total population of Puerto Rico increased less than 12 percent, yet the crude birth rate of Puerto Rico was considerably higher than the United States. Table 5-4 shows the different rates of population change and crude birth rate. Were it not for out-migration, Puerto Rico could have had a serious population increase which would have complicated the development problems of the resource-poor and heavily populated island. (See Stycos and Black, 1959, for a more detailed study of this area)

Table 5-4.—Crude birth rate and population growth, 1940, 1950 and 1960

Item	Crude birth rate (per 1,000)			Population (in thousands)		
	1940	1950	1960	1940	1950	1960
Puerto Rico	38.5	38.7	31.1	1,869	2,210	2,513
% change, 1950-60					11%	
United States	19.4	24.1	23.7		152,271	189,417
% Change, 1950-60					19%	

Sources
Puerto Rico Statistical Yearbook, 1964, p. 5, Table 2.
Statistical Abstract of U.S., 1965, p. 48, Table 48.

More recently, Puerto Ricans have been moving both ways. This movement of Puerto Ricans and Continentals in and out of Puerto Rico has probably been a contributing factor to the relative ease with which many changes in food products and distribution have been accepted.

Table 5-4 indicates that Puerto Rico has had and continues to have a considerably younger population than the United States. Note especially the median age in Puerto Rico, which indicates that 50 percent of the population is under 19. In this respect, the age of Puerto Ricans is more like other Latin American countries than like the United States. Yet, in spite of the high birth rate, the great numbers of youth, and the increasing longevity of Puerto Ricans, the per capita net product of Puerto Rico has grown greatly; certainly, out-migration has been a contributing factor.

Consumption Change

For a number of years, including 1963, total consumption exceeded disposable personal income. According to the *Statistical Yearbook of Puerto Rico*, total expenditures in 1963 were $2,053,000,000, or 101.3 percent of disposable personal income of $2,026,000,000. On the United States mainland, consumption is usually between 90 and 95 percent of disposable personal income. Table 5-5 compares personal expenditures in the United States and Puerto Rico. Two of the most obvious shifts in Puerto Rico have been (1) the decrease in the percent of income spent on food, while diets were being upgraded, and (2) the increase in spending for recreation and transportation from incomes considerably lower than U. S. mainland incomes. Puerto Ricans still spent a larger share of income on food than their mainland counterparts. By 1963 Puerto Ricans were also spending greater percentages on transportation and recreation.

Table 5-5.—Selected age distribution of Puerto Rican and United States populations in 1940, 1950, and 1960

		Per cent 14 & under	Per cent 65 & under	Median Age
1940	Puerto Rico	40.5	3.4	19.2
	United States	25.1	6.9	29.0
1950	Puerto Rico	43.2	3.9	18.4
	United States	26.2	9.3	30.2
1960	Puerto Rico	42.7	5.1	18.5
	United States	31.0	9.2	29.5

Sources
1964 Statistical Yearbook, Puerto Rico, Table 2, p. 2.
1955 Statistical Yearbook, Puerto Rico, Table 5, p. 8.
1965 Statistical Abstract of the United States, Table 48, p. 48.

Another indication of changing per capita consumption of various foods is the index of per capita consumption indicated in Table 5-5. Puerto Ricans are eating higher-quality foods—as a result of free food, higher incomes, and better food distribution.

Free Food Program

The free food program has been a major factor in the reduction of the percent of consumption expenditures spent on food. The program is sponsored by the U. S. Department of Agriculture and the Commonwealth Department of Health. The free food program was established in 1956, when, in response to a hurricane, needy families were provided U. S. Department of Agriculture surplus foods through the Puerto Rican Department of Health. In 1957-58, over $8 million worth of food (valued at its cost to the government) was distributed. The program was expanded by bits and pieces. A major addition was a school lunch program. Later, high protein foods were made available to pregnant women. Over the years the eligibility requirements have been released so that today no Puerto Rican needs to go hungry. In 1965, rice, flour, butter, powdered milk, dried eggs, and lard were given to needy families. The federal government bore the cost of the original food, as it does for all states. In fiscal 1965, the cost to the government of food given to needy Puerto Ricans was nearly $25 million. The development and growth of this free food program has been a boon to the development of the retail food distribution system. No longer is the commercial sector forced to make ethical judgments regarding food for the indigent; the poorest families now receive their needs through government channels. Retailers and wholesalers are not forced to give credit to those very poor families who may never pay anyway, so the retailer does not have the burden of unpaid bills he

had in 1950 when Branson made his study. Neither is the retailer forced to suffer the consequences of pilferage and robbery by those who have insufficient money to buy food.

Table 5-6.—Consumption patterns, United States and Puerto Rico, 1950 and 1963-64

Item	United States		Puerto Rico	
	1950	1963	1950	1964
Food, tobacco, alcohol	33.8%	25.4%	43.9%	32.6%
Clothing, accessories	11.9	9.9	10.1	10.6
Personal care	1.2	1.7	1.0	2.2
Housing & household operations	10.2	13.0	21.4	21.3
Medical care and death	4.9	6.8	3.1	4.5
Personal business services	4.5	6.6	1.1	1.4
Transportation	11.6	12.6	7.9	11.8
Recreation	5.8	6.1	6.1	9.0
Miscellaneous expenditures	2.5	3.8	5.3	6.5

Sources
United States Statistical Abstract. 1965.
Ingreso y Producto, Puerto Rico, 1965, Junta de Planificacion, Table 1, p. 8 grd., Table 13, p. 32.

The retail value of this food give-away program is considerably above the government cost. Assuming that the government cost is 50 percent of retail price, in 1965 the retail value of the free food program was nearly $50 million, 9 percent of total food consumption of $567 million. The public records indicate that some member of 20 percent of Puerto Rican families received free food. Yet only 5 percent of the families admitted receiving that assistance in the consumer food marketing study survey, one portion of the Latin American Food Marketing project. However, the survey was conducted in only two urban areas, San Juan and Mayaguez.

Diet Changes

The change in the Puerto Rican's diet is reflected in the changing makeup of dollar value of imported foods (e.g., rice, beans, etc.). Since 1950, the type of imported food has changed considerably, and local production of milk and eggs has increased. The proportion of rice, beans, and dried cod in the diet has decreased.

Shopping Habits

There is only a limited amount of direct factual evidence of consumer behavior in Puerto Rico since the early fifties. The Department of Labor conducted decennial surveys of consumer expenditure in 1943, 1953, and 1963. One can infer from the studies of Galbraith and Holton, census data, and the Labor Department's survey, that in the early fifties most Puerto Rican families were poor by any

standard. Few had any durable goods, such as refrigerators or automobiles and most families bought food on credit.

A part of the Puerto Rican phase of the Latin American Food Marketing Study in 1965-66 consisted of a survey of families in San Juan and Mayaguez. The survey consisted of 246 households in standard metropolitan statistical areas of San Juan and 141 households in Mayaguez. Although there was only one car for every 75 persons in Puerto Rico in 1946, the survey indicated that half of the families in San Juan and Mayaguez owned cars in 1965. By this time the ownership of refrigerators was almost universal.

Table 5-7.—Percent of families owning cars, refrigerators, and freezers, San Juan and Mayaguez standard metropolitan statistical areas, 1965-66

Item	San Juan	Mayaguez
	%	%
Car	48	50
Refrigerator	96	92
Freezer capacity of 8 lbs. or more in refrigerator	87	78

Source
Consumer Survey, Latin American Food Marketing Study, 1965-66.

The Relative Importance of the Three Types of Retail Stores

For years the *plaza del mercado* was the place to shop for fresh food. Even in 1966, there was a major Puerto Rican government program that helped municipalities rebuild their existing operations. In the opinion of several local people, the plazas still sold a significant portion of the local produce, yet only 44 percent of the families admitted buying any food at the plaza within the two weeks preceding the interview. The money spent at the plaza was significantly less than other types of stores. Table 5-8 gives the percentage of families spending various amounts at the three main types of retail food outlets. It is obvious from these tables that small food stores and supermarkets are much more important than the plaza. The majority of families shop at both *colmados* and the supermarket.

Table 5-9 is another indication of the importance of the supermarket in 1966. The tables indicate the place of shopping on the basis of income. While the table indicates that a significantly larger proportion of higher income families than lower income families, shop at supermarkets, a considerable percentage of the poorest families do the majority of their shopping at supermarkets. Thus, there is some truth in the statement that supermarkets are for the rich; but, like so many popular expressions, there is also an element of falsehood, for in San Juan 38 percent of the poorest families had purchased most of their food at supermarkets in the two weeks preceding the survey.

Table 5-8.—Percent of families buying and average amount spent at the plaza, colmado and supermarket, 1965

Item	Plaza	*Colmado* (small food store)	Supermarket
Percent buying	44	72	58
Most frequent means of transport by those families buying (walking)	66%	83%	69%
Modal distance	Over 1 km.	Same block	Less than 1 km.
Use credit	N/A	57%	9%
Use delivery service	N/A	32%	22%
Modal # times shopped in 2 weeks	2	Bimodal 2 + 8	2 San Juan 1 Mayaguez
Average $ spent in previous 2 weeks:			
San Juan	$3	$22	$28
Mayaguez	$6	$24	$15

Source
Latin American Food Marketing Study survey, 1965-66.

Table 5-9.—Percent of families in four income groups buying their food at supermarkets in San Juan and Mayaguez SMSA, 1965-66

Shopping level	Per cent overall	Family income level[a] Low	Medium	High	Total N
San Juan:					
Supermarket	64.5%	38.1%	65.5%	94.2%	149
Other	35.5%	61.9%	34.5%	5.8%	82
Total N =		63	116	52	231
Mayaguez:					
Supermarket	38.8%	13.8%	43.2%	58.8%	52
Other	61.2%	86.2%	56.8%	41.2%	82
Total N =		29	88	17	134

[a] Low = less than $999
Medium = $1,000-4,999
High = $5,000 or more

Source
Latin American Food Marketing Study survey, 1965-66.

Overall, there was a significantly greater percentage of families buying at the supermarket in San Juan. One of the reasons for a higher percentage of supermarket purchases in the San Juan area is, of course, the greater number of supermarkets there. There is one supermarket for every 2,000 persons in San Juan but only one for every 10,000 persons in Mayaguez.

Lack of Importance of Maids

Before the survey was conducted, many persons had said in in-depth interviews that they thought the maid was a most important person in the shopping for food. The consumer survey indicated this was not true. Table 5-10 indicates the important persons in the purchase of foods for the family.

Table 5-10.—Significant persons in the selection and purchase of food in San Juan and Mayaguez, SMSA, 1965-66

Question	City	Housewife	Man	Husband and wife	Maid
"Who decides what food to buy?"	San Juan 246	83%	7%	10%	0
	Mayaguez 141	75%	12%	11%	0
"Who purchases the food?"	San Juan 246	77%	14%	8%	0
	Mayaguez 141	54%	27%	14%	0

Source
Latin American Food Marketing Study survey, 1965-66.

Co-op Membership

Cooperatives of various forms have been vigorously promoted by the government of Puerto Rico since 1945. One of the results of the Food Commission work in 1954 was a revitalized program for strengthening food cooperatives. Yet by 1965 in San Juan and Mayaguez, food cooperatives were not as important as one might have expected. Only 4 percent of San Juan consumers belonged to a co-op, as compared to 13 percent of Mayaguez consumers. Mayaguez co-op members were more loyal to the co-op, as indicated by their answer that 59 percent of the co-op members would continue buying at the co-op even if other supermarkets had lower prices. This may be because the co-op in Mayaguez was the only supermarket-type store prior to this time. The co-op in the small community of Mayaguez did provide a wide range of goods at low prices. By contrast, only 33 percent of San Juan co-op members would continue buying at the co-op if prices were lower elsewhere. This difference may be due to alternatives available to consumers.

Sense of Community

The small percentage of membership in food cooperatives should not be taken to indicate a lack of sense of community. Puerto Rico is not like the backward society that Banfield (1958) studied in which every person was out for himself and did not see how any good could come from helping others. In Puerto Rico, one senses a faith that things

can be made better by hard work. First, there is a trust in the government, based on 25 years of experience of the government fulfilling its promises. Second, although there are complaints about long lines and minor inefficiencies of government offices, the people seem to share a common belief that the government is honest and truly reform-minded. The consumer survey confirmed this sense of community. Sixty-seven percent of the respondents who thought improvements could be made in their own community said they would be willing to devote 50 hours of free time annually to work on community government projects.

Measurement and Evaluation of Change in Food Retailing

In this section we will attempt to present a more complete description of: (1) the costs of food retailing and how those costs have changed over the years; (2) differences in retail prices in very large and very small stores; and (3) some measures of efficiency in 1965 with comparisons to earlier times and other areas.

Changing Costs of Operation

An average gross margin of 23 percent was reported for Puerto Rican food retailers in 1950. (Galbraith and Holton, 1954.) This figure is compared with gross margins calculated by the Minimum Wage Division of the Commonwealth Department of Labor.

The Department of Labor is required by law to make a detailed study of both revenues and expenses of each industry biennially. The results are tabulated by the sub-type within industries as well as by geographical areas. One of the industries is retailing. Two sub-classifications within retailing are supermarkets* and retail food stores. The data are presented for the entire island and then by three zones. We will deal here with the data for the entire island and Zone 1, which is almost equivalent to the San Juan Standard Metropolitan Statistical Area. It is necessary to look at both of these areas because many of the most meaningful changes in food retailing have been concentrated in San Juan. The data are collected from a disproportionate stratified sample with a census of the largest stores. Stores without employees are not sampled at all, and the fewer the employees the less the sampling percentage. The accountants who prepare these reports have access to records of the various licensing authorities, the income tax returns at the Department of the Treasury, as well as the company's own records. The ground rules under which the data have been collected have remained relatively constant since the first survey was run in 1955. Table 5-11 presents total sales figures for the stores included in the various

* Defined as a self-service food store with 3000 square feet or more of space.

surveys. It is obvious that sales of supermarkets have grown more than sales of other food stores with employees.

Table 5-11.—Dollar sales[a] of establishments in the sample of Labor Department survey of food retailers, Puerto Rico and Zone 1

Year	Puerto Rico		Zone 1—San Juan SMSA	
	Supermarkets (census)	Food stores	Supermarkets (census)	Food stores
	(thousands of dollars)			
1955	7,314	NS[b]	6,048	NS[b]
1956	14,010	97,357	12,411	31,345
1959	38,260	87,272	34,945	19,075
1960	49,835	NS[b]	40,920	NS[b]
1961	56,042	137,434	45,237	32,337
1963	77,005	122,202	60,363	44,941
1964	85,398	132,680	65,198	42,987

[a] The figures in Table 5-11 for any given year will be less than the Census of Business because they do not include: (1) those firms without employees which amounted to over 18,000 establishments selling $37,000,000 of food and drink in 1963; (2) restaurants or restaurants within hotels which had sales of $55,000,00 in 1963; (3) some small firms which are sampled instead of censused. If the figures above are added to the given sales figures and an estimate is made for the sampling ratios involved, they are indeed comparable to the Census of Business. By these standards, between 12 and 20 per cent of sales of S.I.C. 54X and 581 are restaurant and bar sales.

[b] Not Sampled

Source

"La Industria de Comercio al por Menor," Estado Libre Asociado de Puerto Rico, Departmento del Trabajo, mimeographed, various years.

According to Table 5-12, the gross margins for supermarkets have increased from an average of 12.2 percent in 1955 to 17.8 percent in 1964. The National Commission on Food Marketing (1966) reported a similar trend in the United States. However, even as late as 1964,

Table 5-12.—Average profit as a per cent of sales, of supermarkets and food stores in Puerto Rico, various years

Item	1956		1959		1960		1963		1964	
	S.M.[a]	F.S.[b]	S.M.	F.S.	S.M.	F.S.	S.M.	F.S.	S.M.	F.S.
	(Percent)									
Gross profit	12.2	14.2	15.0	11.9	17.1	.....	17.4	12.2	17.8	12.0
Net profit	4.1	3.0	2.8	3.1	3.7	.....	4.2	2.6	4.0	2.1

[a] Supermarkets

[b] Food Stores

Source

"La Industria de Comercio al por Menor," Estado Libre Asociado de Puerto Rico, Departmento del Trabajo, mimeographed.

gross margins for both types of food retailers were considerably less than they were reported in 1950. The larger gross margin of supermarkets since 1959 might imply higher prices. But, as will be discussed more thoroughly in a later section, the greater likelihood is that supermarkets in reality have lower retail prices. Lower retail prices with a larger gross margin imply better buying practices.

However, while the gross margins of supermarkets have been increasing, the gross margins of other food stores have been falling. Gross margins of other food stores in San Juan have dropped from 20.1 percent in 1956 to 15.5 percent in 1964, where the supermarket growth has been the greatest.

The trend of net profits has been similar to the trend of gross profits. Increased wages have absorbed much of the increase in gross profit. Still, the average net profit in 1964 of 4 percent was considerably better than the 2.1 percent average for all Supermarket Institute members. (National Commission on Food Marketing, 1966)

THE NUMBER ONE SUCCESS STORY. Pueblo Supermarkets, the company that most people credit with fostering much of the change in Puerto Rican food distribution, has been even more profitable than the average. As shown in Table 5-13, Pueblo's gross profits have increased most rapidly since 1960 when a wholly owned subsidiary, Pueblo Wholesale Company, was formed. In fact, it can be seen by comparing Tabels 5-12 and 5-13 that Pueblo profits have pulled ahead of the average since 1960. Since that time, the management of Pueblo has concentrated on integration and coordination of marketing activities. It has purchased food processing plants, helped an egg "corporative"* get started, made direct purchase contracts with vegetable producers and encouraged local meat production. (In late 1966, the partially owned cattle fattening operation was closed down due to financial and cattle supply problems.)

The success of Pueblo has attracted the attention of competitors who have become established in Puerto Rico since 1964. The arrival of aggressive competition is probably a healthy omen, since Pueblo was faced with the "General Motors" dilemma.

Pueblo, with nearly 20 percent of total Puerto Rican grocery store sales and perhaps 30 to 40 percent of San Juan grocery sales, is so large that its actions are quite visible. Its high profits are a matter of public record. If profits and growth were to continue unabated, its operations might face monopoly charges. On the other hand, Pueblo

* "Corporative" is a term coined by Dr. Charles C. Slater which denoted an organization managed like a corporation but has the organization and benefits of a cooperative. It represents a needed hybrid for Puerto Rico.

Table 5-13.—Sales and cost of goods sold by Pueblo Supermarkets, fiscal year ending January 31, various years

Fiscal Year	Gross sales (in thousands)	Cost of goods sold (in thousands)	Gross profit	Net profit after tax
	$	$	%	%
1959	13,830.9	11,472.4	17	3.3
1960	17,663.8	14,549.9	17	3.9
1961	21,867.8	17,793.0	18	4.1
1963	31,370.7	25,335.4	19	4.4
1964	38,413.5	30,975.6	19	4.2
1965	47,659.7	37,206.0	21	3.9
1966	55,787.8	43,189.9	22	4.2

Source
Annual reports.

has the capability of reducing its retail prices in order to lower profits. A two percent cut in prices would bring Pueblo's net profits down to the most profitable of United States supermarket firms. But then, on the basis of Table 5-12, half the regular food stores would be losing money if they met those prices. Thus, the "General Motors" dilemma.

SELECTED EFFICIENCY COMPARISONS. In 1950, Galbraith and Holton calculated sales per store, per employee, per customer transaction, inventory turnover, and the number of suppliers for various size retail stores. Sales per employee are compared for selected years of the Census of Business in Table 5-14. Various measures are compared to the 1965 survey data in Tables 5-15 and 5-16.

Table 5-14.—Annual sales per employee in grocery stores, 1948-49 and 1963, as indicated by the U.S. Census of Business

	Dollar Sales per Worker			
	1948-49		1963	
Sales Size	U.S.	P.R.	U.S.	P.R.
All stores	24,216	970	48,631	8,990
Under $50,000	12,581	577	N/A	5,403
$50,000-299,999	25,875	1,524	N/A	16,097
$300,000-999,999	39,372	N/A	N/A	27,653
Over $1,000,000	37,214	N/A	N/A	36,743

Sources
Galbraith and Holton, *Marketing Efficiency in Puerto Rico,* Harvard University Press, 1954, p. 17.
National Commission on Food Marketing, 1966, p. 15.
1963 Census of Business, p. 45, Table C-3.

It is obvious that the scale of retailing has increased considerably. However, there are still many more food stores per inhabitant in Puerto Rico than in the United States. Yet, the total number of stores has re-

Table 5-15.—Average sales (dollars) per store, per employee, and per customer, Puerto Rico, 1950 and 1965-66

Category as determined by municipal license	Per store per year			Annual sales per employee			Per customer transaction		
	1950	1964		1950	1964		1950	1965	
	P.R.	San Juan (mean)	Mayaguez	P.R.	San Juan	Mayaguez[1]	P.R.	San Juan (median)	Mayaguez
Annual sales less than $12,000	5,892	15,953	20,000	4,319	3,500	5,475	.56	.48	.44
$12,000-47,999	24,156	37,338	49,300	10,707	13,550	20,825	1.27	1.55	3.33
48,000-119,999	69,036	127,167	413,500	17,815	11,825	29,975	1.77	1.39	10.67
120,000-479,999	210,996	337,650	N/A	22,810	22,550	N/A	4.00	4.33	N/A
480,000 or more	.....	2,035,927	N/A	.....	48,764	N/A	.....	7.24	N/A

[1] In this and other tables using survey data, it will be noted that Mayaguez retailers have only 3 classes while San Juan classes compare to the 1950 data. The size assessment was made on the basis of municipal licenses. Each community decides its own method of assessing. It seemed that Mayaguez authorities taxed the larger establishments at a lower rate by placing them in a smaller category than they belonged in.

Source

1950 data, interpolated from Galbraith and Holton, Table 5, p. 17.

1965-66 data, Retailer Survey.

Table 5-16.—Average annual inventory turnover and average sales per man hour, Puerto Rico, 1950 and 1965-66

Category as determined by municipal license	Annual inventory turn			Weekly sales per sq. ft. selling space	Sales per man hour	
	1950	1964		1964	1964	
	P.R.	San Juan (mean)	Mayaguez	San Juan (median)	San Juan	Mayaguez (median)
Less than $12,000	12.8	10.5	8.3	1.09	1.40	2.19
$12,000-47,999	12.9	4.7	6.8	1.05	5.42	8.33
$48,000-119,999	12.7	6.4	17.2[a]	1.21	4.73	10.79
$120,000-479,999	12.7	8.3	N/A	2.88	9.02	N/A
$480,000 or more	.....	14.6	N/A	8.68	31.78	N/A

[a] The difference is probably due to the different standard for licensing by size in the two cities. This category contains the supermarkets in Mayaguez, all of which appear to be grossing well over $2,000,000 annually.

mained constant in spite of the increased economies of scale. These economies of scale are best illustrated by sales per employee and weekly sales per square foot of the largest stores. The quantity of customer transactions shows a considerable difference as store size increases. Also, it appears that the largest store sizes in both San Juan and Mayaguez compare favorably with U.S. productivity levels in terms of an inventory turn. Fifty percent of Supermarket Institute members in the United States had inventory turnovers between 14 and 23 times annually. It can be seen that the larger Puerto Rican stores approach the average U.S. supermarket efficiency level. In Table 5-14, 5-15, and 5-16 it is evident that the largest store capacity in each city was by far the most efficient.

The data presented in this section seem to indicate that the larger stores, i.e., supermarkets, are more efficient. The larger stores have the same or lower prices, the highest sales per employee, and the highest sales per customer transaction. The largest stores have the fastest inventory turnover and the most sales per man hour. They also have the highest average net profits.

All these advantages seem reasonable, but they contradict the findings of the National Commission on Food Marketing (1966). In the United States, utilizing confidential data from the nine largest food chains and holding store size constant at various levels of 4,000 through 16,000 square feet, there was found to be no statistically significant correlation between prices and store size.

The analysis by the National Food Commission seems to be remiss on at least two counts: (1) it seems not to have analyzed a large enough range of store sizes; and (2) the data was analyzed by company. Perhaps an analysis by metropolitan area would have led to considerably different conclusions.

Procurement Problems

The one area of food retailing that has not met or contributed to the changing conditions in Puerto Rico is food wholesaling. The mean number of suppliers serving the largest stores in San Juan is 73. Even the smallest stores (i.e., those retailers whose sales are $12,000 annually or less) average six wholesalers. Since the Department of Labor reported 1964 average gross profits of 11.2 percent in food wholesaling and since some large retailers were their own wholesalers,* most local retailers were at a distinct distadvantage in terms of cost. Those operators who were large enough to operate their own wholesaling were saving at least part of that 11.2 percent reported

* 50 percent of the floor space in the stores of the largest supermarket company was devoted to storage. 45 percent of the floor space in the stores of the next largest supermarket company was devoted to storage.

gross profit of the Puerto Rican wholesaler. The 11.2 percent becomes even larger when compared to the National Commission on Food Marketing (1966) of two percent for warehouse and delivery.

Size of Stores

The average size of food stores, eating and drinking places, in terms of sales, is increasing in Puerto Rico but not as fast on the average as in the United States. While Tables 5-15 and 5-16 referred to this, Table 5-17 gives further indications of this growth. The sales of stores selling less than $5,000 annually have remained constant at about five percent of total food sales from 1954 to 1963 for all Puerto Rico. On the other hand, in San Juan, where supermarket growth has been concentrated, the sales of these smallest stores have slightly decreased from 2.1 percent of total food sales to 1.9 percent. During these same nine years, those stores selling more than $1,000,000 annually have grown from one percent of sales to 17 percent for the whole island and, according to the same Census of Business, in the San Juan area, these large stores account for 31 percent of total sales.

Table 5-17.—Average annual dollar sales of food stores and eating and drinking places, Puerto Rico, San Juan SMSA, and Mayaguez SMSA

Year	Total Island	San Juan	Mayaguez
1949	$ 6,514.72	$13,545.88	$ 8,434.46
1954	15,754.06	27,888.15	10,939.01
1958	13,472.78	25,668.09	13,186.44
1963	18,252.93	34,060.91	18,762.24

Sources
1949 Table I, page 3: San Juan Table 63; and Mayaguez Table 50; *1954* Table I-1, p. 3; San Juan Table II-1, p. 48; and Mayaguez III-2A, p. 144; *1958* Table A-1, p. 12; San Juan Table II-1, p. 47; Mayaguez Table III-2A, p. 149; *1963* Table A-1, p. 12; San Juan Table C1, p. 34; Mayaguez Table A1, p. 14.

There has also been a change in number and dollar sales of corporation grocery stores. In 1949, corporation sales of groceries, almost all of which can be assumed to be large supermarkets, amounted to $3,439,000, for the island but by 1963 this figure had jumped to $86,089,000 with over half of the growth coming in the last five years of that period. The growth of corporation sales was even more rapid in the San Juan area over the same time period. The Census of Business reports San Juan metropolitan area corporation grocery sales at $30,181,000 in 1958. By 1963, corporation grocery store sales had increased to $71,036,000.

Thus, while total sales from food stores and eating and drinking places increased from $290,028,000 in 1958 to $411,164,000 in 1963, or 42 percent, the dollar sales of supermarkets increased 48 percent between 1959 and 1963. And, in those same four years, Pueblo's sales

increased 127 percent. Thus, supermarkets in total have had a disproportionate increase over that time period, and Pueblo sales increased even more.

Trend Toward Cash

In 1949, Galbraith and Holton (1954) reported that 94 percent of the retail food stores made some credit sales, while more than half of the stores did 60 percent of their total volume of business on credit. The succeeding Censuses of Business indicate a growing trend toward cash sales, especially in the San Juan area. Table 5-18 indicates this trend more explicitly. It was the smaller stores that were the heavy sellers on credit. It is also clear that credit sales have decreased more rapidly in San Juan than in Puerto Rico as a whole.

Table 5-18.—Trend toward cash sales in food stores, eating and drinking places, 1954, 1958, 1963

Item	Establishments Reporting Some Credit Sales[a]		Establishments Reporting Credit 61-90% of Total Sales	
	Establishment	Total Sales[a]	Establishment	Total Sales[a]
		Puerto Rico		
1954	16,299	162,204.9	4,021	48,352.7
% of total[b]	93.3%	78.2%	23.3%	23%
1958	17,204	178,472.5	4,952	58,336.9
% of total	80.3%	62%	23%	20%
1963	17,862	248,062.3	4,651	63,399.2
% of total	80%	60%	20.7%	15.4%
		San Juan Standard Metropolitan		
1954	3,093	49,476.3	795	13,947.3
% of total	74%	66%	19%	19%
1958	3,031	48,908.6	734	12,565.4
% of total	70%	47%	17%	12%
1963	3,558	74,023.0	524	11,543.0
% of total	66%	42%	10%	6%

[a] All sales figures in $1,000.
[b] All percentages refer to total food stores or food store sales.

Source
1954 Census Table I-6 and Table II-6; 1958 Census Table I-6 and Table II-6; 1963 Census C-5.

Differences in Retail Prices

While price level information and computed price indices are helpful in determining changes over time, they indicate nothing about prices in different kinds of stores at a point in time. Neither do gross profit comparisons tell anything about comparative retail prices. A higher gross profit might reflect higher retail prices, lower purchase prices, or both. In this section, prices of specific items are compared. As a part of an extra study of small retailers in mid-May 1966, it was decided

to collect prices from nearby supermarkets. Prices were collected on nine food items which are used by even the poorest Puerto Rican family. In addition, a comparison was made on the prices of the popular Puerto Rican beverage, rum. Table 5-19 indicates that the average supermarket price was less than the average small store price for five of the nine food items, as well as for all brands of rum. The greatest absolute price difference was on the dried codfish (*bacalao*), which, according to the interviewers, was even more pronounced because the quality of the product was higher in the supermarkets where the price was lowest. The highest percentage of differences was on flour and lard.

Where supermarkets had higher prices, there was an average of nine percent difference. Most of this difference, though, was due to the 30 percent price difference on plantains.

In addition to this factual evidence of prices, which indicates the supermarket prices are similar to but in general lower than small store prices, the owners of the small stores were asked why their sales had decreased. All respondents who reported a sales change reported a decrease. Of the 75 percent who reported a sales decrease, half blamed it one way or another on the fact that supermarkets sell for lower prices.

In the larger store, there is more freedom of action in setting prices in order to achieve a profitable mix. Basic commodities, which all families buy, have a relatively inelastic demand curve from an industry viewpoint. That is to say, the consumption of rice, beans, or dried cod fish, which are very important in the average Puerto Rican diet, will not vary much regardless of the average price. On the other hand, certain convenience foods, such as T.V. dinners, have a highly elastic demand from an industry view. However, the sale of many food products with a highly elastic demand, and greater profit potential, depends to some extent on impulse sales to the consumer. And the way impulse sales are made is by getting the customer into the store. Convenience foods and/or new products are bought mainly by higher income people. These convenience foods may have an inelastic demand at the firm level. That is, the customers may buy a convenience food without much regard to the price once he sees it in the store.

If these situations are perceived to be true, the retailer might well cut prices on the basic commodities, knowing that they are purchased by great numbers, and hope that the lower price on these commodities will act as a drawing card to bring people into the store. In addition, he might reason that with increased traffic he can make a greater dollar profit by selling more of the relatively higher profit foods to the high-income families. If in fact this happens, as it appears to in Puerto Rico, it can have the same effect as a progressive income tax. In this case, as with a progressive income tax, the rich families who are most able

Table 5-19.—Price comparisons on basic foods, supermarkets and small stores, San Juan, Puerto Rico, May 1966

Item	Pueblo 3 Stores	Lucky Seven 3 Stores	Grand Union 3 Stores	Total Mean Price for Supermarkets N = 11	Mean Price for Small Retailer N = 40	Difference — = S.M. Lower
Rice (packaged)	13.0¢	13.0¢	13.0¢	13.0¢	13.0¢	.....
Dried cod fish	27.0	33.0	32.0	30.6	35.1	—4.5¢
Flour	12.3	11.3	8.0	10.9	14.1	—3.2
Lard	20.0	16.3	20.0	18.5	22.9	—4.4
Evaporated milk (Carnation)	17.0	17.3	18.0	17.2	18.3	—1.1
Plantains	7.3	8.0 (2 stores)	8.0	7.1	5.5	1.6
Dried beans (packaged)	21.0	19.6	20.5	20.5	19.3	0.9
Tomato sauce (8 oz.)	8.7	10.0	10.0	9.2	10.0	—0.8
Corn meal (packaged)	10.3	10.3	10.0	10.2	10.1	0.1
Rum (Don Q Llave)	$2.057	$2.09 (1 store)		$2.01	$2.36	—35
Others		$1.545 (2 stores)		$1.41	$1.94	3.0
All rums				$1.86	$2.12	6.0

to afford it are paying more. Because of competition, the basic commodities are priced near to or perhaps even below cost. So the poor family gets food at a lower price than it could in the smaller store where only the basic commodities are sold at a higher price since the small retailer cannot depend on impulse buying of high profit items by rich families.

On the other hand, with basic commodities being priced at or near cost in the larger stores, the small retailer is faced with a dilemma. He must: (1) let the price spread widen between his small store and the supermarket and thereby lose customers; or (2) meet the lower price in his own store and thereby lose profit; or (3) expand his store to sell a wider line at a time when his profits are decreasing.

Supplemental Survey

As previously cited, an additional survey of small food *colmados* was made in May 1966. The sample was purposive and the number was small ($n = 40$). But it was felt necessary to have a better indication of what happened to the small retailers and why there had not been greater opposition to the rapid growth of supermarkets in the San Juan area.

Three reasons seemed to predominate:

1. Supermarkets had taken business from the small stores and, as they had done this, the husband had lost his usefulness as a shopper for groceries. He would still stop at the *colmado,* but instead of buying food, he bought a beer or two. In this way the small stores became similar to neighborhood taverns.
2. The beer and rum companies, with funds available for merchandising and advertising, made it easy for the small food stores to sell beer and rum.
3. The operators knew that the government supported the large store operations.

The majority of the 75 percent of respondents who claimed that their sales had gone down blamed it on the lower prices that consumers find in the supermarkets. According to the respondent's recall, there had been very little, if any, increase in sales of any type of item. The only claims of increase were on sales of "liquor for on-premise consumption" (seven percent), and sales of "liquor to take out" (four percent). Most of the decrease had been in food. In fact, 86 percent of respondents answered that their food sales had either "decreased a little" or "decreased a lot." Alcoholic beverage sales decreased less: about 72 percent of respondents claim decrease in "liquor sales to take out," and —the lowest rate of decrease—about 50 percent of respondents said that their "liquor sales for on-premise consumption" decreased either a "little" or "a lot."

Beer and rum sales seem to have been of some importance to small retailers, especially sales of these alcoholic beverages for on-premise consumption. Although there is insufficient evidence to say with assurance that the increased consumption of beer and rum contributed to the ease with which supermarkets have become dominant, it can be inferred that liquor sales have definitely helped the small retailers to subsist after the supermarket invasion.

Although a small retailer often has to pay supermarket retail price for the bottle of rum, he profits on it by selling it by the drink—something that the supermarkets cannot do. Nevertheless, when asking the small retailer, "What have you done to defend yourself from supermarkets?" only one respondent answered that he had "devoted more to liquor." Yet, about 80 percent of respondents who sell liquor claim that they would not obtain enough profits to stay in business if they were to stop selling liquor.

Employment Effects

The previous sections have discussed how the largest stores which have the fewest employees per thousand dollar sales have been the most successful in sales growth. Still, the employment statistics suggest a double-edged effect from changes in food retailing.

At the present time in many of the Latin American countries, a great percentage of goods consumed does not enter into the market economy at all. It is consumed where it is grown. Thus, there are fewer jobs than there would otherwise be if more food moved through the retailing sector. An increasing percentage of food moving through the marketing system at any given point in time will mean an increasng number of jobs. This phenomenon has frequently been overlooked by theoreticians as well as political decision makers who have recognized the possibility of changing the food distribution system. These people have been concerned about the elimination of disguised unemployment in food retailing. Galbraith and Holton in their 1954 report were concerned with the unemployment that would become obvious if food retailing were rationalized.

Since the day of Adam Smith, most persons have accepted the view of specialization that he articulated: with specialization one's standard of living can be higher. Therefore, from a theoretical standpoint, it would seem likely that many families would prefer to specialize and buy their food, if the food they need is priced lower and/or they have increases in real income and/or the food becomes more available in the food stores. In Puerto Rico, a greater percentage of social food consumption is moving through the commercial sector. Table 5-20 indicates how the percentage has increased since 1949.

Table 5-20.—Percent of food consumed that is purchased in the retail system food stores and eating and drinking places, various years, 1949-1963, Puerto Rico

Year	Number Food Stores,[a] Eating and Drinking Places	Sales Value of Food Purchases (Millions)	Total Value Food, Liquor and Tobacco Consumption (Millions)	Percent of Food Moving Through Retail Store
1949	19,811	130.1	294.4	44
1954	17,558	208.9	390.7	53
1958	31,327	290.0	459.9	63
1963	22,526	411.7	656.6	63

[a] Grocery stores not separated from eating and drinking places.

Sources

1949 Census of Business, Puerto Rico, Table 1, p. 12.
1954 Census of Business, Puerto Rico, Table 1-1, p. 3.
1958 Census of Business, Puerto Rico, Table 1-1, p. 3.
1963 Census of Business, Puerto Rico, Table A-1, p. 12.
Ingresso y Producto, Puerto Rico, 1965, Junta de Planificacion, Febrere 1966, Table 13, pp. 32-33.

In Puerto Rico, only 44 percent of the total food consumption was passing through the retail food stores in 1949. As a result of private and intensive government effort to bring about both industrialization and marketing changes an increasing percentage of the food, over the years has been passing through the marketing sector. By 1958, 63 percent of the food consumed was passing through the retail stores. This additional percentage passing through the retail sector created over 12,000 new jobs at 1958 average productivity levels. One could say that in regard to food distribution, more of a "national market" was and is being created.

There have been increasing efficiencies in food retailing. Since 1950, average sales per employee have increased considerably. Still, there is a wide range of productivity among retailers. For example, in 1963, the dollar sales per employee for supermarkets was $40,000, while the average dollar sales for smaller stores was only $5,000 per employee. Suppose that Puerto Rico had only supermarkets with the average productivity of $40,000 per employee. Then employment could have been as low as 10,000 people working in food distribution, instead of over 47,000 people. On the other hand, without any supermarkets, and if all stores had productivity of $5,000 per employee, employment would be over 80,000 in food distribution.

Thus, it can be seen that the employment effects of changes in food retailing are two-sided in nature; increased employment, as a result of more food passing through the marketing system, and unemployment created through increasing productivity of each worker. In the time

period under consideration, paid employees working in food stores and eating and drinking places increased from 2,906 to 25,032. However, total employment did not change drastically, because each establishment must have a proprietor and many small stores have family help. The result was that over 23,000 persons were working in food retailing in 1949, as compared to over 47,000 in 1963.

Conclusion

By 1963, 63 percent of the food in Puerto Rico passed through commercial channels versus 44 percent in 1949. $287,000,000 would have passed through commercial channels in 1963 had only 44 percent of food been commercially sold. Since the average productivity in 1949 meant $5,000 per employee when the food price index was at 91.2; in 1963, the food price index was 144, the per-employee sales in 1963 would have been $7,900 in current dollars, assuming no change in productivity. Thus, by dividing per capita sales in current dollars into the sale figure as if 44 percent went through commercial channels, we can estimate the number of employees the food retailing industry would have had if no increase in commercial channels had developed, i.e., $287,000,000÷$7,900/employee equals 36,200 employees. In contrast, the 1963 food retailing employment was 47,000. Such comparisons are specious because other factors changed, such as income and the mix of food products eaten. However, such analysis does suggest that instead of always being a labor releasing industry when developed, food retailing can absorb labor. This is especially true when the productivity increases are accompanied by gains in real income, a relative reduction in retail price, and upgraded quality.

Politicians and technicians have been reluctant to recommend changing the food distribution sector because of the potential problems resulting from retiring present employees. And, most plans for reform do recommend increasing possible output per employee. Thus, regardless of possible potential benefits to the consumer, the spectre of immediate and increasing unemployment far outweighs those potential consumer benefits in the mind of the political decision-maker. Puerto Rican politicians thought differently and were willing to risk unemployment.

The above analysis also suggests that in a dynamic economy relatively lower prices can mean increasing employment in food distribution because more food is passing through retail stores. In Puerto Rico, the aggregate result has been increased employment. At least some of those employment increases have come about because of increasing labor efficiencies and prices lower than they would otherwise have been. Total employment has increased in food distribution and thus new entrants have come in.

VI. THE RESULTS IN AGRICULTURE

In this chapter we will explore the relationship between the changed output of three farm commodities at the same or lower cost per unit and the differences in the amount of coordination by the marketing system beginning with the farmer and continuing until the commodities reach the consumer.

Three commodity groups were chosen for detailed study in order to describe and analyze, for the period from 1950 to 1965, the important changes in market organizations and to relate them to specific performance criteria reflecting the basic societal goal of economic growth. The commodities are eggs, milk, and fresh fruit and vegetables. A second purpose of the commodity studies is to provide a description of the evolution of certain types of government marketing policies and institutional forms and to evaluate their contribution to more orderly and efficient markets and greater farm output. Finally, the commodity studies provide evidence to test the hypothesis that a production and marketing system characterized by small scale, unorganized and atomistic business units will lead to a set of conditions inhibiting the development of more efficient techniques and will result in high production and distribution costs and low product quality.

The particular commodity groups were chosen primarily because of the diversity represented by the three in terms of market institutions, government regulations and assistance, structural characteristics, behavior of competitors and performance of the industries. Marketing developments in the three commodity groups provide an excellent opportunity to examine the economic impact of various degrees of

government marketing assistance and the effect on economic performance in the industry.

Eggs

The data available for comparing egg production efficiency for 1950 with 1965 suggest: (1) the size of producing units has been increasing; (2) the growth of specialized commercial producers has been accompanied by better management practices and greater production per hen; and (3) real production costs have been reduced significantly.

Very little data are available for evaluating changes in the cost of marketing eggs in Puerto Rico. One of the reasons is that significant changes have taken place over the past 15 years with respect to the marketing and coordination arrangement. Currently available data are not comparable to earlier data because the production and marketing phases have been vertically integrated through private firms and cooperative associations. The importance of truckers and other middlemen in the exchange process has declined. The 1966 farmer survey in the Mayaguez region revealed that none of the eggs produced by farmers in the sample (which included about 71 percent of all commercial producers in the region) was marketed through truckers. About 20 percent were sold directly to retailers and 75 percent to cooperatives or marketing associations. Egg marketing specialists in Puerto Rico argue that this vertical integration has lowered exchange costs by eliminating (1) excessive transaction costs and (2) duplication of marketing services, by reducing market information gathering costs, by lowering uncertainty and by permitting more accurate scheduling of production, grading, and distribution to the satisfaction of consumer demand. The atomistic and imperfectly competitive markets of the early 1950's, in comparison to the present marketing structure, appear to have fostered higher exchange costs.

Progressiveness

The first measure of performance, progressiveness, is based on the degree to which available innovations have been adopted. Egg producers in Puerto Rico, by and large, were quite slow to adopt available innovations prior to 1957. One basic area in which innovation was possible was in organization for efficient commercial egg production. Despite the fact that a few commercial producers did exist, the adoption of commercial egg production came fairly slow and only after marketing coordination changes. From 1957 to 1964 the number of commercial egg producers more than doubled.

Another potential egg production innovation, which was slow to be adopted, was improved breeds of laying hens. The value of baby chick imports(for both broiler and laying stock) was $249,188 in 1950,

$505,420 in 1957, and $951,843 in 1965. Indications are that most of the imports in earlier years were dual purpose breeds rather than the more specialized and efficient strains of layers and broilers. The farm survey in the Mayaguez agricultural region, which included 57 commercial egg producers, indicated that of all those farmers now using improved laying breeds, only 20 percent had begun doing so prior to 1957. As a result of the slow adoption of improved and specialized strains from the United States, production per hen remained fairly low until 1957. At that time the adoption process speeded up, and average production per hen moved from 168 eggs on commercial farms to 232 eggs in 1964-65.

Similarly, the innovation of scientifically mixed and controlled feed rations, after having limited acceptance in the early 1950's, has been rapidly adopted since 1957. Total commercial poultry feed sales (including broiler feeds) almost doubled from 1958 to 1964.

The fact that at present at least 25 percent of all domestically produced eggs are candled, graded, cartoned, and delivered in refrigerated trucks to retailers shows the rapid improvements in marketing methods.

All of these innovations are closely related to the first innovation—organization for efficient commercial production. Adoption and improvement with respect to that innovation is still very much in process in Puerto Rico. But indications are that the adoption process is moving rapidly.

It is significant that almost half of the commercial egg producers on the island are members of some kind of economic organization for the encouragement of egg production. The types of organizations include a highly integrated corporate firm, a marketing firm using producer contracts, and a non-profit marketing and supply corporation owned by producers. Members of these groups are generally believed to be the most progressive on the island, and it appears that for egg production in Puerto Rico the displacement of atomistic competition in egg production and distribution by the various institutional forms has stimulated production and encouraged technological innovation.

Product Quality

As noted earlier, the quality of eggs available to the Puerto Rican consumer was low and quite variable before 1957. Since there were no government grading regulations, consumers could not be sure that they were buying a consistent quality of size and quality of egg from one purchase to the next.

In contrast to this situation, it is estimated by the authors that about 25 percent* of all eggs produced in Puerto Rico in 1965 were graded,

* This figure was obtained by estimating, from personal interviews, the yearly

packaged, and distributed under quality regulations specified and enforced by the Department of Agriculture. This means that the eggs were candled, graded, sized, and placed in one dozen cartons with the date of packaging indicated and the inspection seal of the Department of Agriculture applied. The bulk of these eggs were distributed through supermarkets, superettes, and large *colmados*. However, the competitive effort of better quality eggs in supermarkets and larger *colmados* has improved the quality of eggs sold directly to consumers and distributed through various combinations of producers, truckers, and small retailers. Distributors of eggs through these channels have been forced to deliver better quality eggs in order to compete with the larger retailers handling only consistently fresh graded eggs. The length of time from production to consumption has been significantly reduced. Finally, the quality of imported eggs has been improved as a result of changes in domestic production and marketing practices and government regulations. At one time Puerto Rico was used as a dumping ground for surplus and low quality U.S. eggs. More effective coordination and improved handling methods of local producers, in conjunction with government import regulations, has brought a marked improvement in the over-all quality of imported eggs.

Milk

By 1950 dairying had developed as one of the major agricultural enterprises in Puerto Rico. In fiscal year 1950 the total value of milk production was 21.8 million dollars—second only to sugar cane in the value of farm output. Thus, milk production accounted for more than 10 percent of the gross value of agricultural output in 1949-50. Koenig reports that from 1940 to 1950 considerable progress was made toward improving the production methods and sanitation requirements of dairy farms in Puerto Rico. (Koenig, 1953) These changes were accompanied by some significant improvements in production efficiency. Puerto Rican dairy farmers have been fairly successful in lowering real costs of production over the fifteen years since 1950.

Data from an unpublished manuscript by Placido Acevedo demonstrate the change in the real cost of milk production on first class dairy farms between 1953 and 1963. Acevedo found that production costs, as reported by the Puerto Rico Minimum Wage Board, were 13.60 cents per quart in 1953 and 16.50 cents per quart in 1963. Net returns per quart were 2.4 cents in 1953 and 1.3 cents in 1963. So the absolute cost of producing milk on first class dairy farms in Puerto Rico increased by 2.9 cents per quart from 1953 while net returns

production of the six major egg producers who grade and package all their production; summing that figure and dividing by the total domestic production.

declined from 2.4 to 1.3 cents per quart. If the 1963 cost of production per quart is inflated by the consumer price index, the cost of production for that year stated in 1963 dollar values is 18.25 cents per quart. Hence, the real costs of production in 1963 were 1.75 cents per quart less than in 1953-54.

It should be emphasized that these figures deal only with first class dairies. No attempt is made here to evaluate the production efficiency of second class or non-commercial producers. Their production generally remained constant during the period under consideration while first class production increased by over 500 percent. This fact in itself is indicative of improvements in production of efficiency. The shift from a second class license or from a non-commercial producer usually involves an investment in additional sanitation equipment. Frequently, the farmer realizes that to make the changeover to first class production profitable, he must increase the scale of output and adopt more efficient production techniques. Hence, the producer who obtains a new first class license is likely to invest some additional capital in upgrading or increasing the size of his herd, purchasing milking machines or other equipment, and improving feed production or handling facilities. These kinds of improvements have been shown to be cost reducing or output increasing innovations among dairy farmers in the United States and in Puerto Rico. Thus, one may conclude that the rapid changeover to commercial first class production has probably been a positive factor toward greater over-all production efficiency.

Table 6-1 contains four series of statistics on first class production of milk in Puerto Rico. These statistics give some indication of possible changes in production efficiency since 1950. The first column shows the number of first class dairy farms in operation at the end of fiscal years 1952 through 1965. The number increased from 296 in 1963 to 747 in 1965. The percentage increase in first class dairy farms was 38 percent during the five year period from 1952 to 1957. But during the first five years that the milk regulation was in effect (1957-63), the number of first class dairy farms increased by 56 percent.

During 1953-54, a comparison was made between the average production of cows on first class dairy farms and average production for all other dairy cows. The average production per cow on first class dairies was more than twice the average production of all other dairy cows. Column 4 in Table 6-1 indicates that average daily production per cow on first class dairy farms has increased from 8.10 quarts in 1953-54 to 11.20 quarts in 1964-65. Going back to 1949-50, the average daily production was only 7.03. It is evident that first class dairy farms have made significant improvements in productivity per cow since 1950.

Table 6-1.—Statistics of First Class Dairy Farms in Puerto Rico, 1951-65

Year	Number of First Class Dairy Farms	Average Number of Cows Per Farm	Total Production (Thousand Quarts)	Average Daily Production per Cow in Production (Quarts)
1951-52	296*	73	45,635	
1952-53	330*	71*	56,542	
1953-54	360*	72*	70,974	8.10
1954-55	400	73	80,051	
1955-56	400*	82*	93,239	
1956-57	410	90	104,344	
1957-58	465	89	114,471	8.98
1958-59	521	89	129,916	
1959-60	566	93	151,556	
1960-61	588	100	165,018	
1961-62	639	99	183,354	10.53
1962-63	691	97	206,504	10.49
1963-64	718	103	225,269	10.68
1964-65	747	107	251,794	11.20

* Estimated

Source

Office of Milk Regulation and Bureau of Agricultural Statistics, Department of Agriculture, Commonwealth of Puerto Rico.

Finally, column 2 in Table 6-1 shows the average number of cows per first class dairy farm for fiscal years 1952 through 1965. The number has increased almost yearly from 73 in 1951-52 to 107 in 1965. This figure may or may not be an indicator of improvements in production efficiency. The relevant average cost curves for different size dairy farms have not been determined by research studies in Puerto Rico. While the average number of cows per farm has been high throughout the period under consideration, this might be due to the fact that economies of scale do in fact exist, or it might be caused by the fact that first class milk producers in Puerto Rico have historically been large landowners who may not have known about cost at various herd sizes but who did have an abundance of capital and land to invest in dairying. It is probably more likely that some economies of large scale production do exist since the trend toward larger herds has been quite pronounced and steady.

Exchange Costs

Prior to the passage of the milk regulation in 1957, the dairy industry was completely dependent on a bargained price system for allocating available supplies in the market place. Producers were free to sell their milk to the highest bidder, and processor-dealers were also able to bar-

gain for the best deals. In such a system, daily supplies and demands established the price of milk.

Exchange costs in a competitive price system are frequently somewhat high, especially for perishable commodities.

There are several reasons for this trend. Supply agreements between buyers and sellers are often quite unstable. It is always possible that either the buyer or seller will find a more attractive offer and terminate the arrangements; so the other party has to find and come to terms with another buyer or seller. In such a search process, the individual must incur certain costs associated with gathering and evaluating information, bargaining with possible buyers or sellers, and making the final decision. In the event that a buyer is not immediately available, the seller may incur financial losses due to spoilage of the product. Finally, indirect costs may be present in a competitive exchange system because of the necessity of financial hedging against risks and the abandonment of business investment opportunities because of price or supply uncertainty.

These factors, in addition to a pronounced seasonal production pattern, combined to make exchange costs fairly high in the milk industry prior to 1957. There are no data available to indicate the magnitude of such costs, but undoubtedly they were regarded by producers, distributors, and processors alike as too great to tolerate since a government regulation was requested and supported by the industry.

The result of that request was a regulation which provides for a marketing system in which most exchange relations were administered by a government agency. Exchange costs under such a stable arrangement were probably reduced significantly. Moreover, price and supply arrangements became completely stable under the regulation. The administered price system almost completely eliminated information gathering, bargaining, and market risks. Of course, the elimination of these costs would have done producers and distributors little good if the set prices had not been sufficiently high to cover production and distribution costs with an acceptable margin of profit. It appears that the industry has been satisfied with the operation of the regulatory system since, as noted earlier, a high percentage of farmers and processors surveyed in this research project indicated a belief that the regulation had been beneficial to producers, distributors, processors and consumers.

Progressiveness

Findings in several different countries by Tax, Banfield, Schultz, and others suggested that technological progressiveness is one of the critically important factors for improving agricultural productivity. The rate at which proven technological innovations can be diffused among agricultural producers is a critical variable in determining the rate of agri-

cultural output of a given commodity. Of the writers mentioned, Tax, Banfield, and Belshaw imply that the structure and coordination of the marketing system may have a significant effect on technological progressiveness among agricultural producers. Data on the Puerto Rican dairy industry indicate first of all that producers have readily adopted improvements in production techniques since 1950 and secondly that market stabilization through government administration has been a positive factor in the adoption process.

The contrast between the two following statements points up the magnitude of technological changes on dairy farms in Puerto Rico since 1950. The first statement is an excerpt from Koenig's 1953 study of the Puerto Rican agricultural economy in 1950, and the second is drawn from a doctoral dissertation on adoption of innovations among first class dairy farmers in 1965.

> This industry is only slightly mechanized. As a result, the man-hours needed to produce 100 pounds of milk is from 3 to 4 times as great as the number required on the mainland. Only a few dairies in Puerto Rico use milking machines. Few use power mowers or cutters. Still fewer have silos. Farm and barn layouts are poor. Production is low. There can be little doubt as to the important roles that mechanization and related technology could play in the improvement of dairying on the island. (Koenig, 1953, p. 180)

> In this dramatic development (rapid change-over to first class dairy farms and rapid increase in output since 1953), the adoption of new technology has played an important role. At the present time such innovations as artificial breeding, pasture improvement, better feeding methods, better breeds, farm records, mechanization, and disease and parasite control are widespread. It is apparent that the rapid growth of the dairy industry has been influenced by favorable farmer predisposition toward the adoption of new technology. (Oliver-Padilla, 1964, p. 57)

In his study, Oliver-Padilla gave farmers a list of specific innovations and asked them, among other things, if they had ever used the practice and if they were now using it. Table 6-2 includes a list of the innovations he specified and the percentage of the 233 farmers in the sample who had (1) used the practice and (2) permanently adopted it. At least a majority of producers had permanently adopted six out of the ten innovations. The percentage of adoption among farmers samples for such important innovations as fertilizers, use of artificial breeding, and pasture improvement was over 70 percent.

Our sample survey of 1966 included a set of questions on technological innovations. The sample of 54 included a high percentage of all

first class dairy farmers in the Department of Agriculture's Mayaguez region. Of the 54, 99 percent had permanently adopted fertilizers, and 89 percent had permanently adopted insecticides. In addition, Placido Acevedo and Felix Roman at the Office of Milk Regulations have indicated that virtually all first class milk producers had bulk storage tanks (since all pasteurizing plants use bulk tank pickups) and milking machines as of 1965. And Oliver-Padilla (1964) noted that an estimated 95 percent of all first class dairy farms now have milking machines.

Table 6-2.—Percent of First Class Milk Producers in a Sample of 233 Who Used and Permanently Adopted Specific Innovations, 1964

Innovations	Percent of Sample Who Had Used The Practice	Percent of Sample Who Had Permanently Adopted the Practice
Fertilizers	99.1	98.7
Internal Parasite Control	92.7	90.9
Artificial Breeding	84.1	68.2
Pasture Rotation	80.7	78.5
Pasture Renewal	77.2	71.2
Herbicides	57.5	50.6
Insecticides	48.1	40.8
Salt Stations	44.6	35.6
Record Keeping	18.0	14.6
Silage	8.6	6.4

Source
Oliver-Padilla, 1964.

Impact

The impact of government market regulations on the rate of adoption of innovations is demonstrated by the data in Table 6-3 which indicates the rate of adoption of certain innovations. Perhaps one of the most important innovations in dairy production has been the changeover to mechanical milking. Puerto Rican farmers purchased only $62,529 worth of new dairy farm equipment in fiscal year 1951 (the bulk of which was for milking machines). While the amount purchased increased each year through 1957 when purchases amounted to $222,931, purchases dropped off in 1958 only to rise again in 1959. A second type of production innovation which has been important in improving productivity is pasture improvement. The number of *cuerdas* (approximately an acre) of pasture established as well as the number of *cuerdas* improved increased steadily from 1954 through 1959—reaching a combined total of 50,800 *cuerdas* in the latter year. Both dropped off a bit in 1960 but remained fairly high through 1964. Finally, government incentive payments to producers for the purchase of construction of new equipment or facilities followed the same pattern. Payments rose

steadily through 1956 with a sizeable decline in 1957 followed by a jump in 1958. And payments fluctuated between $40,000 and $140,000 per year after 1958.

The general pattern for these innovations seems to be a rapid increase during the years prior to 1959, and followed by either continued less significant expansion or relative stability.

Table 6-3.—Value of Dairy Equipment Imports, New and Improved Pasture, and Incentive Payments to Dairy Farmers in Puerto Rico, 1951-64

Year	Import Value of Dairy Farm Equipment (dollars)	New Pasture Established[a] (*cuerdas*)	Pasture Improved[a] (*cuerdas*)	Cash Payments to Producers for New Equipment and Facilities[b] (dollars)
1950-51	62,529	.....	.....	.....
1951-52	23,847	.....	.....	.....
1952-53	29,644	.....	.....	.....
1953-54	73,653	5,300	4,700	4,500
1954-55	162,582	12,200	5,500	23,965
1955-56	213,809	14,800	4,900	39,596
1956-57	222,931	22,300	5,300	18,722
1957-58	63,792	19,200	16,200	22,815
1958-59	124,988	32,200	18,600	40,871
1959-60	126,174	18,900	6,900	84,978
1960-61	164,689	23,500	7,100	108,691
1961-62	210,584	27,287	9,656	139,830
1962-63	307,287	30,000	8,200	120,357
1963-64	228,365	.....	.....	91,424

[a] Refers to the amount of new pasture established and *cuerdas* improved with assistance from the Commonwealth government's pasture improvement program.
[b] Refers to government incentive payments to producers for purchasing new equipment or facilities, e.g., silos, molasses tanks, stables, milk rooms, etc.

Source
External Trade Statistics, Puerto Rico Planning Board and *La Industria de la Leche y de la Ganaderia*, Junta de Salario Minimo, Departmento del Trabajo, Estado Libre Associado de Puerto Rico, December, 1964.

Fresh Fruits and Vegetables

Puerto Rican farmers have traditionally emphasized the production of starchy fruit and vegetable products. Historically, Puerto Rican consumer incomes have been such as to require large quantities of those items. Prior to 1950, there was little demand for such items as lettuce, tomatoes, and cucumbers because most urban consumers could not afford to purchase such products. As incomes began to accelerate, however, there was a growing demand for products not normally produced by Puerto Rican farmers. At the same time consumer demand for

starchy vegetables was declining. Puerto Rican fruit and vegetable producers have had difficulty adjusting to these changes in consumer demand.

The nature of fruit and vegetable production and distribution have made it difficult for producers and distributors to fully adapt to changing consumer wants. Production (as a secondary enterprise) on widely dispersed sugar, coffee, or tobacco farms with few specialized commercial producers has resulted in limited interest in changing consumption among fruit and vegetable producers. Then too, the conditions in the distribution system for traditional fruits and vegetables have been such that adjustments were also difficult to effect there.

These two factors combined to result in a stagnant production and distribution system for fruits and vegetables from 1950 to 1965. Virtually all production was derived from sugar, coffee, or tobacco farms or from part-time or subsistence units. There was only a slight change in the composition of fruit and vegetable output, i.e., green and leafy vegetables or fruits vs. starchy products. The marketing system continued to center around merchant truckers.* Marketing methods and practices remained virtually the same.

While conditions in domestic fruit and vegetable production remained static, significant changes were taking place in food retailing on the island. The introduction of the first supermarket on the island in 1950 and the growing acceptance of the marketing institution since that time has already been discussed. In 1965, supermarket sales accounted for about 22 percent of retail food sales on the island and the percentage has been increasing rapidly.

Because the existing marketing system for fruits and vegetables in Puerto Rico does not satisfy the demands of well managed supermarkets, the new supermarkets, and many large-scale, self-service grocery stores competing with them have turned to the mainland for a stable supply of consistent quality produce. However, it has been necessary for them to purchase local specialty items such as the starchy vegetables in largest supply on the island, bananas, plantains, yams, taniers, casava, etc. Table 6-4 indicates the farm value of domestic fruits and vegetables compared to the value of imported fruits and vegetables (calculated value alongside ship at the port of embarkation in the U.S.). While the value of imports has remained equal or slightly larger than domestic production throughout the past 15 years, recently imports have captured a slightly larger proportion of total supplies.

It is obvious from the foregoing discussion that production and

* The farmer survey indicated that for the Mayaguez Region farmers about 42% of all fruit and vegetable sales were made to truckers. Produce wholesalers purchased only 19%, retailers 14%, cooperatives 11%, processors 7% and "others" 7%.

Table 6-4.—Value of Domestic and Imported Fruits and Vegetables, Puerto Rico, Fiscal Year 1951-65

Year	Domestic[a] Production $1,000	Imports[b] $1,000
1950-51	19,986	14,294
1951-52	24,082	19,895
1952-53	22,397	22,487
1953-54	23,543	20,849
1954-55	23,190	23,199
1955-56	23,749	23,697
1956-57	20,577	24,697
1957-59	23,929	27,270
1958-59	22,806	25,889
1959-60	26,975	27,166
1961-62	30,193	
1962-63	31,852	33,499
1963-64	33,967	34,999
1964-65	36,034	39,582

[a] The value figures represent farm value of starchy vegetables, green and leafy vegetables, legumes and fruits.

[b] These figures represent only imports from the U.S. (since foreign shipments are quite small) and reflect values of products "free alongside ship" at the port of embarkation on the mainland. These import values include processed fruits and vegetables as well as fresh.

Source

External Trade Statistics, Puerto Rico Planning Board and *Foreign Trade Reports,* U.S. Department of Commerce.

marketing of the bulk of fruits and vegetables produced in Puerto Rico has changed very little over the past 15 years. As a result rapidly expanding supermarkets and self-service retailers have continued to depend heavily on U.S. imports. There are four reasons for this reliance.

First the bulk of the production has come from extremely small specialized farms or from farms on which the production of fruits and vegetables is a secondary enterprise. Table 6-5 shows some of the characteristics of farms classified as minor crop and fruit and nut farms in the Census of Agriculture. These are farms having gross farm sales of at least $150 during the year for which more than 50 percent of all sales were in products classified as minor (e.g., rice, pigeon peas, dry beans, sweet potatoes, yams, taniers, etc.) or fruit and nuts (all tree fruits, nuts, and pineapples). The table shows that there were relatively few such specialty farms, although there was a slight increase in their number between 1950 and 1959. It also indicates that the average number of *cuerdas* in cropland on minor crop farms was 9.5 in 1950 and declined to 7.0 in 1959. Similarly, the average number of *cuerdas* in cropland on fruit and nut farms declined from 14.5 to 9.5. While data were not available to classify these farms on the basis of size (total

Table 6-5.—Characteristics of Minor Crop and Fruit and Nut Farms in Puerto Rico, 1950 and 1959

	Minor Crop		Fruit and Nut	
	1950	1959*	1950	1959*
Number of Farms	961	1,082	1 651	3,547
Cropland in Farms (*cuerdas*)	9,132	7,588	23,914	33,763
Average Cropland Acreage per Farms	9.5	7.0	14.5	9.5
Number of Farms by Size:				
1-9 *Cuerdas*	.....	875	.....	2,955
10-29 *Cuerdas*	.....	197	.....	430
30-39 *Cuerdas*	.....	7	.....	130
100 or more *Cuerdas*	.....	3	.....	32
Fertilizer Purchased (dollars)	39,800	39,137	339,130	437,538
Tractors	.....	1	.....	74
Trucks	.....	34	.....	136
Irrigated Land in Farms (*cuerdas*)	.....	4	.....	110

* The 1959 data were derived from a sample of producers on the island, and they may include sampling errors.

Source
Census of Agriculture, 1950 and 1959.

acreage in farms including cropland and pasture) in 1950, such a classification for 1959 reveals that the majority of both minor crop and fruit and nut farms have less than nine acres per farm. Thus, during the ten year period from 1949 to 1959 census data give no indication of a trend toward the development of specialized fruit and/or vegetable producers.

Second, there have been no significant improvements in production methods. Table 6-5 also gives the value of fertilizers purchased by minor crop and fruit and nut farms in 1958 and 1959. Fertilizer purchases were extremely low for minor crop producers in 1950 ($39,800) and declined slightly in 1959 to $39,137. Fertilizer purchases by fruit and nut farms increased from $339,138 in 1950 to $437,538 in 1959. This increase may have been due to a few new specialized pineapple and papaya producers who started commercial production during the period. Moreover, Table 6-5 indicates that in 1959 tractors and trucks were practically nonexistent on minor crop farms while fruit and nut farms had a total of only 74 tractors and 136 trucks. Admittedly, these census data do not completely reflect the production situation for fruits and vegetables since some progressive, efficient producers could be classified elsewhere because they have over 50 percent of their sales in some other commodity. But they should suggest that those who glean the majority of their income from fruit and vegetable production have made relatively few production improvements.

Third, fresh produce wholesaling and processing has shown little improvement since 1950. Products are still largely assembled by merchant truckers buying at concentration points or more often directly at the farm. The products are then transported to one of the municipal markets on the island or occasionally directly to retailers or even consumers. The municipal markets, however, remain as the single most important marketing institution for fruits and vegetables. In 1964 about 34 percent (in terms of value) of all starchy vegetables produced on the island were marketed through one of the seven largest market plazas. Similarly, about 30 percent of all fruits and 43 percent of all green and leafy vegetables passed through those markets. These high percentages in and of themselves give no cause for alarm since it is common even in the United States for large municipal markets to serve as a meeting place for buyers and sellers of fruits and vegetables. But the conditions and facilities of most municipal markets (and especially the larger ones) are far from satisfactory. They are generally the same kinds of markets that existed in 1950 since they provide no unloading wharfs, no sorting areas, no cleaning facilities and generally no area for the operation of wholesalers or brokers. There is usually only a limited amount of parking for trucks. About all they do provide are small cubicles for the operation of retail businesses.

There are only a few (four to eight) specialized fruit and vegetable wholesalers on the island, and there are no wholesalers who handle a wide variety of fresh produce. A few firms have been organized in the last few years to specialize in a narrow range on commodities (e.g. a potato wholesaler and a wholesaler handling only tomatoes, peppers and cucumbers). But individual truckers still provide the bulk of produce wholesaling services. Similarly, fruit and vegetable processing facilities on the island have expanded slowly. A high percentage of the canned and frozen fruits and vegetables consumed on the island are imported. There are three fairly large canning plants on the island—one was established in 1949 and the other two about 1955 and 1961—whose main products are pigeon peas, tomato paste, and beans. In addition there are several smaller processing plants specializing in fruit juice, nectar, and paste. Because of their limited number and size, these processing plants have had only a small effect on the total production and distribution system for fruits and vegetables in Puerto Rico.

Finally, the Puerto Rican government has had little success in improving the condition and efficiency of fruit and vegetable production on the island. In 1955 the Commonwealth Department of Agriculture hired a mainland consultant, Harry W. Day (1955), to study the marketing of fresh fruits and vegetables and make recommendations for improving its efficiency. He found the marketing system to be poorly

coordinated and highly inefficient with little progress being made toward improvement. He recommended that the government take immediate action to fill the following needs, using whatever programs and incentives necessary. (1) Establish at the grower level, through individual producers, cooperatives or specialized firms, organizations for receiving, grading, washing, packaging, and delivering fresh produce to retailers or produce wholesalers in urban areas. These organizations would replace to some extent merchant truckers. (2) Organize and establish a sufficient number of privately owned and operated *service wholesalers* who would secure their supplies described in (1) above and would supplement the supply of these products with others needed from the states. (3) Encourage the development of supermarkets and other improved retail food stores on the island. (4) Prepare simple and practical grading regulations and provide adequate education and encouragement to assure their use among marketing firms. (5) Adopt standard containers adaptable to specific commodities and require their use in packing for local markets. (6) Provide intensive training programs for produce handlers, demonstrating efficient marketing methods. (7) Improve marketing information and communication methods (especially telephone service). (8) Provide loans and technical assistance for produce handlers interested in improving marketing facilities and methods.

These recommendations undoubtedly were broad and would have required an ambitious program to implement immediately. Day recognized this and suggested that the program should be a long range (10-15 year) effort. He did feel, however, that the government should start immediately with a fairly intensive effort.

The government of Puerto Rico has enacted programs designed to accomplish at least four of the recommended improvements. Yet, the programs have generally had only a limited effect on the fruit and vegetable marketing system. The Department of Agriculture tried to encourage grading, washing, and packaging by constructing facilities in Naranjito to be used by farmers and wholesalers as a rural collection point, but the market nas never been used to any extent for the intended purpose.

A second effort to encourage grading and improved handling of fruits and vegetables was the establishment of a government owned and operated wholesaling facility established to supply produce for public institutions. The facility was to demonstrate the beneficial effects of improved handling methods and facilities or product quality and efficiency. Unfortunately, the business was never well managed and has not made any significant improvements over the handling methods of truckers and other middlemen.

Recently, the assets of this government produce wholesaling facility have been turned over to a central produce cooperative being organized by Fomento Cooperativo. The cooperative plans to collect produce from its members at a central packing facility in San Juan where grading, washing, and packaging will be performed. Then the cooperative will deliver produce orders directly to retailers. Results suggest that the cooperative is having the same management problems as the previous government wholesaling facility.

Other government fruit and vegetable marketing programs include a market news service and educational programs in produce handling by the Agricultural Extension Service. The market news service collects daily price information in the municipal markets and disseminates it through a radio program. The lack of consistent grades coupled with the combining of retailing and wholesaling operations in the same market seriously reduces the value of the government's price information to producers and distributors. Even though the training programs of the Extension Service have been helpful in some cases, in general they have not attracted the interest of the people most needing the assistance. Limited success has therefore been achieved in four of the eight areas Day stressed as important in the improvement of produce marketing.

The Department of Agriculture has been interested in the fruit and vegetable marketing system but has not attacked the more critical problems relating to actual changes in marketing institutions and practices. For example, little has been accomplished toward creating effective cooperative or private farm receiving and packing facilities, creating efficient service wholesalers, establishing usable grades, or standardizing containers. As a result the marketing system remains basically the same as observed by Day in 1955.

Isolated Marketing Improvements

In spite of the fact that the marketing of fruits and vegetables has remained largely the same since 1950, there have been some recent individual developments that suggest potential improvements.

Bananas have traditionally been produced by coffee growers for shade and supplementary income. They were sold to independent truckers who in turn sold them in municipal markets. In 1957, a banana marketing cooperative was organized among eleven banana producers with government assistance. Though little progress was made toward improving incomes or services to members during the first five years, by 1961 the cooperative had begun to increase its volume considerably. Between 1961 to 1965 gross annual sales increased from $241,000 to $526,000 and during that same period significant marketing improve-

ments were made. The cooperative established a ripening plant in San Juan. They started to assemble, wash, grade, and pack bananas at a rural shipping station in Adjuntas. Finally, a well organized merchandising and delivery system was implemented. The effect has been to improve markedly the quality of products marketed while stabilizing prices and incomes for producers. The two large chain supermarkets on the island now make all banana purchases from the cooperative as do many smaller retail stores on the island. Until last year all the cooperative's supply of bananas came from trees interplanted with coffee. But in 1965 several producers began specializing in the production of bananas. It is expected that others will rapidly follow suit.

Tomato sauce is a staple in the Puerto Rican diet. Until recently most canned tomato sauce was imported from the United States. Tomato production has (like other fruit and vegetable crops) been relegated primarily to hilly and less productive agricultural land with small family plots of native varieties supplying tomatoes for fresh consumption only. About three or four year ago, Libbys, one of the island's major importers of tomato sauce, decided to establish a tomato processing plant in Puerto Rico. Since there were few commercial producers available and even fewer who were capable of or interested in producing the kinds of tomatoes needed for processing at a price considered realistic by the processor, the plant's management decided to lease good quality land on which to produce their own supply. The operation has been quite successful. In addition to producing processing varieties, the firm has expanded to the production of varieties suitable for fresh consumption. The poorly organized market and low quality of other local tomatoes has created a need for a well organized firm producing consistent and high quality fresh tomatoes, especially for sales to supermarkets and other large retailers. The firm started out producing 75 acres, mostly processing varieties, but has now expanded to 150 acres with a significant proportion planted with table varieties. Libbys' success has caused other firms to consider producing and processing tomatoes (either through complete vertical integration or producer contracts) on the island.

Since local produce has generally been available only through the market plazas or through independent truckers, the supermarket chains on the island have had great difficulty in efficiently filling their needs. As noted earlier, they have often turned to the mainland for supplies. However, many products either are not available from the states or are much more expensive than local products. In those cases the supermarkets have been forced to deal with local suppliers. Until recently the chains made local produce purchases in the municipal markets or from independent truckers. The products were delivered to the

individual store where they were washed, graded, and pre-packaged. Product quality and handling methods of such product suppliers were inadequate to the needs of such retail stores. In an effort to overcome these cost and quality disadvantages, all three major chains have begun programs of direct buying. The purpose is to fill the void created by a complete lack of service wholesalers. The method of procurement varies by product and among retailers, but the main objective is to discover and encourage suppliers who will furnish (at premium prices in some cases) stable supplies of high quality produce. The results have been encouraging. A sampling of such suppliers for the various chains includes: (1) a single producer under exclusive agreement supplying graded, washed, and sacked yams and potatoes; (2) a loose knit group of producers supplying specified quality and quantities of leaf lettuce; (3) a marketing cooperative supplying graded, washed, and crated oranges; and (4) a trucker specializing in the distribution of consistent quality, graded, and crated pineapples.

Efforts to improve agricultural productivity through regional planning were mentioned earlier. As a result of such efforts in the Mayaguez region, several producer associations have been organized. Egg marketing associations in Lajas, Mayaguez, and Isabela were previously described. And a similar association whose members are primarily coffee producers who use native orange trees for shade has been organized for orange producers at Maricao. The purpose of the association is to establish an orange processing plant. Organizing methods for this project were similar to those used in the egg marketing associations. Personnel from the regional office of the Department of Agriculture generated interest among producers, initiated a feasibility study with Fomento, made arrangements with the Agricultural Development Bank for loans of $1,000 to each member for investment in the cooperative, later obtained a loan from Fomento, and generally coordinated the efforts of several interested government and private agencies. The plant was completed early in 1966 at about the middle of the orange harvesting season. It began operations immediately, producing canned orange juice for export to the mainland. Producers were receiving an average of $35 per ton for their oranges as compared to $25 per ton the previous year. If satisfactory markets (both external and internal) can be obtained, the plant will contribute significantly to the agricultural economy of the region. It will provide a stable market outlet for native oranges, a commodity frequently left unharvested by coffee producers or sold at ridiculously low prices because of overabundance (for fresh consumption) during the short harvest season.

A similar development is the recent organization of a joint committee between Department of Agriculture representatives, Fomento's

Division of Puerto Rican Industries, and the Food Processing Laboratory of the Agricultural Experiment Station to study and recommend possible food processing opportunities on the island. Fomento coordinates feasibility studies including market opportunities, supply dependability, and technical feasibility. The other agencies represented on the committee are able to bring special abilities to assist in particular aspects of the preliminary study. Once the study is complete, prospective investors are able to evaluate more accurately the investment potential. Then Fomento can offer the usual variety of incentives such as tax reduction, site procurement assistance, loans, etc. The interagency approach is relatively new, but appears to have the advantages of linking a wide variety of talents to evaluate all aspects of the proposed plant, including supply procurement, financing, and marketing.

Production and Marketing Performance

It is clear that production of fruits and vegetables has been regarded and continues to be regarded largely as a secondary or even tertiary enterprise in Puerto Rico. Long years of such thinking coupled with the limitations of the antiquated marketing structure have operated together for so long that they have come to be accepted as normal conditions to which the economy has had to adjust itself. (Koenig, 1953) This slightly altered quotation from Koenig's 1950 study describes the production and distribution system for fruits and vegetables in 1965. When evaluated by most of the performance criteria used in this study, the industry has shown little improvement. In a few cases minor improvements are developing as noted in the previous section. Their impact on various performance criteria will be discussed.

Costs of Production and Marketing. As a result of poorly coordinated marketing system and prevailing belief that fruit and vegetable production should only be supplemental to more important farm enterprises few improvements have been made in production efficiency. Though data are not available to indicate the efficiency of present resource use in fruit and vegetable production, it appears that committed resources are being combined relatively efficiently. As Schultz *et al.* noted in other countries, the difficulty does not appear to lie with inefficient management or lack of a profit motive, but rather with insufficient utilization of improved production techniques. Basically, the land, labor, and capital resources committed to fruits and vegetables are insufficient and inferior. Puerto Ricans have not yet "recognized" the opportunity for reaping significant profits by specializing in the commercial production of these food crops using advanced techniques. One of the few produce wholesalers in Puerto Rico was asked by the author why he did not purchase more of his supply from local pro-

ducers. He answered that because of perceived market risks and uncertainties "producers are not even interested in vegetable production." This same reason was given time and again in in-depth interviews with producers, processors, and retailers—excessive risk and uncertainty retard producer interest. Results of a question on our farmer survey indicate that 38 percent of the farmers in the sample had never considered tomato production, and 36 percent had never considered producing other fruits and vegetables because of the market risks involved. A few commercial fruit and vegetable producers are making production improvements (e.g. the integrated tomato producing firm, an integrated private producer of starchy vegetables, a papaya producers' association, and scattered individual farmers), but the bulk of production is carried out under the same procedures used in 1950.

Since the market structure has shown little change over the past fifteen years, there has consequently been little improvement in marketing costs. The system is still characterized by small scale producers, truckers, and retailers competing atomistically. Because of this, information gathering costs, transaction costs, and market uncertainty costs are still relatively high. Again the organization of certain marketing institutions (e.g. corporate supermarkets, wholesalers, and cooperatives) is just beginning to have an impact on exchange efficiency in fruit and vegetable production and distribution in Puerto Rico.

Progressiveness

Technological change in fruit and vegetable production and distribution has come slowly. The bulk of total production still comes from farms using the same methods used in 1950. The survey among farmers in the Mayaguez region indicated that fruit and vegetable producers who had adopted fewer of the technological innovations varied from a high of 98.5 percent for fertilizers to a low of 18.4 percent for packing products into some kind of protective container.

Only 51 percent had adopted improved varieties of crops. Similarly, only 85 percent had adopted insecticides. When compared to milk and egg producers, fruit and vegetable producers were considerably less innovative. The median percentage of usable innovations which had been adopted by fruit and vegetable producers in the sample was 50 percent while the median for egg producers was 86 percent and for milk producers 81.5 percent. It should be emphasized that the sample included only farmers in the Mayaguez Region. The results can be used as an indicator of the progressiveness of producers in other parts of the island, since their production characteristics are quite similar.

By the same token, marketing firms have been slow to improve distribution methods. The earlier description of prevailing marketing

methods suggests that relatively few technological changes have been made among marketing firms.

Product Quality

While the general quality level of Puerto Rican produce is basically the same today as it was in 1950, pressure from expanding supermarkets has caused some improvements in refrigeration and handling, but these have been limited to a few products and primarily to supermarket sales. An experimental station survey in 1964 in the major tomato producing areas suggested that practices in the harvesting, handling, packing, storing, and transporting of tomatoes resulted in an extremely high level of waste and spoilage. Isolated quality improvements have been achieved by the banana marketing cooperative, an orange marketing cooperative, the integrated tomato producer, and a few independent procedures.

Summary

It should be obvious to the reader by now that government programs assisting producers and/or distributors in the three industries reflect three different strategies. The marketing program developed for milk producers and distributors has regulated practically every phase of the industry, including pricing. Government egg marketing assistance has been less intensive, centering on facilitative regulations and technical assistance to cooperative groups. With respect to fruits and vegetables, government policy has reflected less urgency and has emphasized programs to inform producers and improve the competitive structure of the market (i.e. "perfect" the market).

The conclusions of these commodity studies are discussed below.

(1.) In the production and distribution of eggs and milk, performance has been satisfactory as measured by the three criteria used in this study. Generally, production and marketing costs have been reduced, and the two industries have exhibited significant progress in adoption of improved production and distribution techniques. Product quality has improved significantly both in milk and egg markets. On the other hand, the production-distribution system for fruits and vegetables has shown little change since 1950 (with the exception of isolated cases). When measured by any of the three criteria, industry performance has been below a desirable level. Probably, the difficulty is due to the decline in demand for traditional Puerto Rican fruit and vegetables, coupled with a high degree of marketing risk and ineffective traditional marketing procedures.

(2.) Production and marketing performance data for the milk and egg industries definitely suggest that rapid industry improvements have

coincided closely with market coordinated changes. The trend toward improved performance was closely correlated (chronologically) with such developments as government market regulations, cooperative development and private marketing institutional change. But the analysis does not show causality. Impinging variables are far too numerous and complex and data far too scarce to accomplish such an analysis. However, the performance changes accompanying government market programs and private marketing developments in the milk and egg industries, together with the lack of performance change in the relatively unregulated, unassisted, and atomistically competitive fruit and vegetable industry, suggest that positive efforts to foster market development may yield significant results in developing countries.

(3.) Performance results in these three industries support the hypothesis that excessive atomistic competition hampers productivity improvements by stifling technological innovations and inhibits the agricultural and marketing development process by fostering market uncertainty, high transaction costs, and excessive market wastes, and by preventing the effective transmission of incentives to firms in the production-marketing system. This hypothesis is supported by the fact that marketing developments in the egg and milk industry have revealed a definite trend toward fewer firms and/or cooperation among existing firms for the purpose of improving market coordination. As noted above, these two industries have shown rapid performance improvements since 1950. On the other hand, the competitive structure of the fruit and vegetable industry has remained atomistic with relatively few efforts to organize large scale private firms, cooperatives, or institutional forms for the purpose of improving market coordination. Taken as a whole, performance in this industry has not improved significantly since 1950. It is significant, however, that the major performance improvements have come in segments of the industry where specific market organizations have been created to cope with the market coordination problems evident in the atomistically competitive industry.

VII: AN ANALYSIS OF INNOVATIVE BEHAVIOR AMONG FOOD RETAILERS AND FARMERS IN PUERTO RICO

This chapter presents some further insights into the development process of food marketing in the economic growth of Puerto Rico through the special lens of social research. The measurement and analysis of innovative behavior are considered in detail. The previous chapters have generated some insights into the role of food retailing and farming in the economic development of Puerto Rico. We will look at innovative behavior of both groups in this chapter. The food retailers and farmers were interviewed separately, and the data from both surveys will be reported.

Many economists have become convinced of the limitations of economics per se and realize the necessity of discussing the role of the innovator or entrepreneur, Joseph A. Schumpeter (1934) in particular dealt with this problem; John M. Keynes alluded to it in his discussion; L. J. Zimmerman (1965) has suggested that being concerned only with resource, allocation will not solve the problems of development. Robert M. Solow and others have concentrated on the role of technical change.

A more recent example of an economist who feels uncomfortable working within the limits laid out by the neoclassicists is Harvey Leibenstein. In an article in the June, 1966, issue of the *American Economic Review*, Leibenstein reviews seven studies in six different nations that have been concerned with misallocation of resources on a macro level, as well as 27 studies of labor productivity in certain industries in seven different countries. He notes that the welfare effects of macro-misallocation of resources are small, apparently less than 2 percent. However:

> There is one important type of distortion that cannot easily be handled by existing microeconomic theory. This has to do with the allocation of managers. . . . But the [economic] theory does not allow us to examine this matter because firms are presumed to exist as entities that make optimal input decisions, apart from the decisions of its [sic] managers. This is obviously a contradiction and therefore cannot be handled. (Leibenstein, 1966, p. 397)

On the other hand, the 27 studies cited by Leibenstein revealed productivity increases from 5 to 71 percent with little, if any, added investment. Leibenstein admits that a large part of these productivity increases would come from motivation which is not a normal economic variable. One of the purposes of this chapter is to try to explicate some of the variables in what Leibenstein calls "x-efficiency."

Although there have been numerous studies of innovation, few have been published in the field of marketing. The Michigan State University Diffusion Documents Center, under the leadership of Everett Rogers has available over 700 empirical studies on the spread of new ideas, but only 15 of these studies are in marketing. Thus, there are few published empirical studies concerned with diffusion of innovations in marketing just as there are few empirical studies concerned with the related area of marketing's role in economic development. Yet without innovation in marketing, it is doubtful that marketing can make a contribution to economic development.

Innovation as a Condition for Growth

It has become almost axiomatic that economic development cannot take place unless *some* people change. E. E. Hagen, an economist, was troubled by what he perceived to be the inadequacies of the explanations contained in various economic theories of development. His experience in Burma led him to look for a better explanation of the growth process. Early in the book *On the Theory of Social Change*, he spells out his dissatisfaction with the capital accumulation approaches of some previous economists.

> They all assume that the central problem in growth is capital formation and they all assume that sufficient technological creativity to carry forward economic growth is present in all societies. Now it is clear beyond any question that technological creativity is responsible for a far greater share of increase in productivity than is capital formation. (Hagen, 1962, p. 49)

Hagen chose to follow some of the ideas laid out by Schumpeter. Along wtih Schumpeter, he believed that change begins when a person

becomes dissatisfied with society and wants to reform it. This person, the innovator, is open to new phenomena, and he believes previously unnoticed aspects of the world are meaningful and knowable. "He trusts his evaluations of the world. The prospect of resolving a problem therefore attracts him." Anxiety is common and creates a "gnawing feeling that the [innovator] is not doing enough, or well enough. Repeatedly, they escape from their anxiety temporarily by creative achievement." (Hagen, 1962, p. 86)

In order for the innovator to reveal himself, Hagen feels it is necessary for a disturbing event to occur. Subsequently, respect from "significant others" is withdrawn, and the group, of which the would-be innovator is a member, finds itself without the desired amount of status. When there is withdrawal of respect, there are several avenues open to the individual or the group of which he is a part; "he may become ritualistic, retreatist, innovational, or rebellious." (Hagen, 1962, p. 198)

It is evident that many of the seeds of Hagen's ideas are in H. G. Barnett's landmark book *Innovation: The Basis of Cultural Change* (1953). Barnett suggests that the innovators are the dissidents, the dissenters, the indifferent (those to whom customs are not important), the disaffected (those who have experienced major crises), or the resentful. While Hagen and Barnett both say that one finds innovators among members of these groups, neither one of these authors explains why some and not all members of these groups *become* innovators.

Although innovation has been found to be a necessary condition for economic growth and increasing agricultural production, few would suggest that it is a sufficient condition. In fact, there are examples of great innovators (e.g., the Tucker of auto fame) who were forced out of business.* Thus, innovation is a necessary but not a sufficient condition for growth. It is possible to overadopt new innovations, but frequently it is impossible to know when overadoption has occurred until a later time period.

A case example of innovation as a necessary but not sufficient condition is cited below.

In the mid-fifties in San Juan, Puerto Rico, there was a chain of four supermarkets which were among the few in existence in Puerto Rico at that time. These four supermarkets were, by the standard presented later in this chapter, among the first innovators, but they were closed by bankruptcy within a short time. However, another man started a supermarket chain in 1956 and adopted many of the same practices used by the bankrupt firm. In 1966, his was the most success-

* Looking at such matters after the fact, one can smugly assign the hundred dollar word, "overadoption" to such failures. But the state of the arts of measurement of innovation makes it only an after the fact consideration.

ful and perceived to be the most progressive supermarket chain in Puerto Rico. Many attribute his success to managerial skill, which is measured only with difficulty, if at all.

PART I: Innovations Among Retailers

Methodology

Medium-size retailers were selected for study because they were large enough to enter the race for modern retailing operations. Yet the two largest organizations have been exempted primarily because they were used to provide the criteria for the attributes of innovation. On the other hand, the very small retail outlets in Puerto Rico were exempted from this analysis because theirs is a special kind of retail business much more in the tradition of the street merchant or tiny *tienda* that is accounting for a smaller and smaller share of the Puerto Rican food business.

The investigation of food retailing innovations involved nine specific items. These nine items are so common in mainland United States retail grocery stores that they are accepted as the natural way of doing business. They were selected after in-depth interviews when the two largest food retailers in Puerto Rico indicated their applicability there.*

Research in the diffusion of innovations on the basis of recall data has its limitations, just as every research technique does. One is usually looking at a small, select number of innovations introduced to a given economic group over a specific time period. The selected innovations are a non-random sample of all possible innovations. Since it is recall data, one can question only those respondents who have remained in business throughout the years.

Such a technique creates two possible biases in a dynamic situation.

* The analysis in this chapter does not utilize all 140 retailer interviews, nor does it include the establishments of Puerto Rico's two largest food retailing firms. The result of the former exclusion is that the statistical analysis is based upon 91 respondents and ignores the 49 "subsistence retailers," who seem to be quite different from the larger ones. They were found to have few accounting records. They were older. Because they were socially and statistically different, they are not included in the factor analysis. The name "subsistence" retailer is given these operators because, even with the outrageously high 30 percent gross profit and 10 percent net profit, the profit for the largest operator would only be $1,200 per year. Since the two largest retail firms were used to establish a valid list of innovations, these, also, were not included in the analysis presented in this chapter.

Some entities could have adopted or did adopt certain innovations and have gone out of business in the intervening time. To the extent that they differ from those remaining in business, bias is introduced. On the other hand, in a dynamic situation, new firms are always entering. If innovativeness is measured on a basis of time of adoption, the new firm may be categorized as a late adopter when, in fact, it is one that adopted the practice as soon as it could. Then, too, when the subjects of the research are business establishments, there is the problem that the firm, and decision-makers within the firm, are separate. In the rural sociology tradition, wherein lie the roots of this type of research, the individual farmer has been assumed to be "the farm." In contrast, few businesses have only one decision-maker. To the extent that such assumptions do not hold or are not statistically controlled, unexplained variance may be higher and/or a bias may be introduced.

Another problem with this type of research is the recall of earlier behavior. It has been indicated by George Katona, of the University of Michigan Survey Research Center, that recall for any behavior over a time span of more than a few months is subject to gross errors. Still, a cross sectional diffusion study requires small information. Rogers and Rogers (1961) noted that recall of several items provides more accurate information than recall of a single item. We have used several items in our innovativeness scales.

In this study there are nine items making up the various innovativeness indices. Retailers were asked about the applicability and use of: (1) self-service groceries, (2) self-service meats, (3) prepackaged produce, (4) cash registers, (5) off-street parking, (6) sales on cash only, (7) paid advertisement, (8) participation in training, and (9) group purchasing.

Each respondent was asked about the applicability of each of the nine innovations for his operation. If he felt the item was applicable, he was asked if he ever used it. If he had ever used it, he was asked the year he adopted it and if the innovation was in use at the time of the interview. Up to this point, the methodology was very similar to other studies of diffusion of innovation.

One of the main differences between this study and previous ones was that the applicability of each of the nine innovations was also judged by the author. The applicability for each innovation was the author's opinion based upon his practical experience in food distribution and also upon other sections of the questionnaire. The author assumed that all of the stores interviewed could use a cash register, parking space, sell on a cash basis only, and could purchase through a group. The applicability of the other five innovations depended upon what the store sold, the size of the store, and other economic variables.

Thus, the author's view of applicability was that of an outside judge or expert. Methodologically, it could be checked by other judges but was not.

Having the two judgments concerning the applicability of the various innovations was felt to be a necessary step because of the wide diversity of food retailers. In addition, it was thought that there would be a significant positive correlation between an "objective measure" of an outsider and the owner-manager's perception of the applicability of given innovations. It was hypothesized that there would be a significant positive correlation between the index of agreement on perceptions between the objective source and the owner-manager and the other innovation indices.

Five different indices were constructed from the survey information. The indices were constructed as follows:

Innovation Index #1: This index notes only the gross number of applicable innovations adopted. The expert's opinion of applicability for adoptions was summed for each respondent and divided into the sum of the number of innovations that had been adopted. This result was multiplied by 100. The highest possible score would be 100 percent and the lowest would be zero.

Innovation Index #2: This index measures the earliness of adoption. The year of adoption column was converted to a percentile for each innovation. The percentiles were summed and divided by the number of applicable innovations in order to arrive at an average.

Innovation Index #3: This index measures innovativeness in comparison to the age of the firm. The hypothesis underlying this rather different index was that firms innovate when they are new. After being in business a while, they stop innovating. The index was constructed by the year of establishment of the firm (minus a constant 1 in order always to work with positive numbers) from the year of innovation. The differences are summed and then divided by the number of subtractions performed in order to have an average which can be compared to different numbers of innovations.

Innovation Index #4: This is an index of perceptual agreement. Here the expert's opinion of the applicability of the nine innovations was divided by the sum of the owner's opinion of the applicability.

Innovation Index #5: This index is the summed relationship between the owner's perception of the applicability of the nine innovations and the use of those innovations. It measures the extent to which perceptions of possible use and actual use of the innovations can be correlated.

It was hypothesized that there would be significant correlations between each of the five innovation indices. Table 7-1 below indicates the zero order correlations.

Table 7-1.—Zero order correlations between the various innovation indices (N = 91)

Innovation Index	Innovation Index 1	2	3	4	5
1. (PIA) percent of innovations adopted	1.				
2. (AYA) average year of adoption	.767**	1.			
3. Self renewal	.121	.042	1.		
4. Perceptual agreement	.948**	.585**	.129	1.	
5. Do use/could use	.311**	.061	.169	.354**	1.

** Statistically significant at or beyond the 99 percent confidence level.

The hypothesis did not hold up in certain indices. It is obvious that Index #3 was measuring something different from the other indices.

Table 7-2 shows: (1) the lack of agreement between the expert view of applicability and the owner's view of applicability for each innovation; (2) the high degree of correlation between what the owner believes applicable and his use of that innovation; and (3) the correlation between the expert opinion as to applicability and the use of the innovation.

Columns 1 and 3 show the low degree of correlation between the expert opinion and the use of the innovation by the firm. Basically, column

Table 7-2.—Perceived applicability and use of each of the nine innovations

Innovation	Owner Perception Versus Expert Perception	Owner Perception of Applicability Versus Firm Use	Expert Perception vs. Use of the Innovation
	r	r	r
1. Dry grocery self-service	.191	.899**	.173
2. Meat self-service	.280**	.951**	.266
3. Prepackaged fruit and vegetable	.303**	.985**	.298
4. Cash register	.177	.902**	.160
5. Parking for cars	.041	.999**	.041
6. Cash sales only	.060	.946**	.057
7. Paid advertising	.039	.998**	.039
8. Training programs	.056	.889**	.050
9. Group purchasing	.028	.998**	.028

** Significant at or beyond the 99 percent confidence level.

2 reveals that firms are using those innovations the manager believes applicable. The high correlation between Innovation Index #4 and Innovation Index #1 in Table 7-1 indicates that the agreement is greater in those firms with high adoption rates. Among those firms with higher percentage adoption, there is a higher agreement in perception of innovations. (The correlation coefficient is $4 = .948$.) Thus, one could conclude that innovative firms perceive possibilities to a greater degree than non-innovative firms.

This low correlation coefficient between the perception of the outside expert and the perception of the owner-manager could lead to two or three different conclusions. The first possibility is that the United States "expert's" view of what innovations are good, proper, and necessary for a food retailing establishment are invalid for food retailers in San Juan and Mayaguez, and the owner-managers know this. The significant correlation between perception of individual innovations and the percentage of innovations adopted (PIA-Index 1), as well as the significant correlation between perception and average year of adoption (AYA-Index 2) would tend to discredit this line of argument.

Another possible interpretation is that the United States expert's opinion is in actuality valid, but the operator does not consider use of the innovation as advantageous to him. The experience of 20 years of failure by traveling experts in having their recommendations implemented might be accepted as tentative proof that the outside advisory expert is unlikely to accomplish change in the system.

If change comes about when a man with the power to do something risks what he has because he believes in the change, then extra capital will not necessarily bring about the change. In food retailing, in Puerto Rico at least, the owner-managers who are not now using the innovations see little need for them. Thus, when innovation occurs, either the attitudes change, or new people who see additional opportunities come into the business. The main change agents in Puerto Rican food retailing have been new entrants. Rogers noted that if one expects high adoption, "it is the characteristic . . . not as seen by experts but as perceived by the potential adopters that really matters." (Rogers, 1962, p. 123)

Prediction of Innovativeness

Much of Rogers' work has been concerned with obtaining sufficient information for predicting innovativeness. Social scientists have completed studies and now have tests which purport to predict the probabilities of success in specific occupations, academic pursuits, and even marriage. However, those who loan money for investment, as well as those government officials who are concerned with bringing about social change, have little to go on except faith in their own expertise.

Consider the case of Puerto Rico in the mid-1950's. The governor had requested studies of food distribution. A commission analyzed the studies and recommended that the food distribution system needed change. The Economic Development Administration (EDA) made available technical assistance and capital for changing the system. As with most projects of this type, funds and administrative time were not unlimited. Thus, one of the first problems was to select which businessman should be helped by major government efforts. The banker's standard for loans is past performance for which wealth is a fairly good indicator. Thus, an upstanding, respectable, second or third generation businessman would have a better chance to obtain a loan than would others. It was noted that the theories of E. E. Hagen (1962) and Eric Hoffer (1963) suggest that the "outsider" is more likely to try something new and unproven. Also mentioned earlier, the executives of the Economic Development Administration found that to be the case in Puerto Rico. Successful local businessmen were unwilling to shoulder the risk of new ideas. They were unwilling to risk what they had for the uncertain future of something that might fail. Thus the EDA was forced to turn to outsiders as well as those Puerto Ricans who had not yet been eminently successful. It was a matter of intuition to identify those who would be more likely to succeed.

It would be helpful to know the characterstics which explain some, if not all, of the variance in innovations of food retailers. Since a program of directed change has taken place in Puerto Rico since 1955, a study of the factors associated with innovations in food retailing would be worthwhile as a preliminary effort to devise a predictive tool for the use of change agents in food retailing in other areas.

Three such methods of analysis were used in this study. First, the zero-order correlation of a number of independent variables was compared with the two highest intercorrelations of measures of innovativeness (the dependent variables). (These two are Innovation Index #1 —percentage of innovations adopted [PIA], and Innovation Index #2—average year of adoption [AYA].) The second method was the multiple correlation of series of "independent" or predictor variables with the dependent variables in terms of innovation. And, third, factor analysis was employed as a search method to see which variables are most related to the various measures of innovativeness.*

Zero order correlation, the relation of one independent variable to one dependent variable, is subject to the same limitations as the Chi-

* Many of the diffusion studies have used Chi-square or the t-test to check for significant differences in two-way relationships. While such studies are useful they provide less usable information for the decision-maker or change agent because the variables are isolated from the system within which they operate.

square or t-test, except that it provides an indicator of the strength of the relationship. It indicates how much prediction of the independent variable can be improved by knowing the value of the dependent variable. Still, zero order correlation has the weakness of abstracting one variable from the interrelationships of the world of reality.

The purpose of utilizing such an approach for understanding which firms and individuals are innovators is one of economy, or, in other words, a task of successive approximations. The method most economical in time and money is zero order correlations. If the zero order correlations do not give satisfactory results, then multiple correlation will be utilized. In order to see what variables go together, to better understand certain ideal types and thereby better understand who are the innovators, factor analysis will be used.

Some Zero Order Correlations

Earlier a number of bivariate hypotheses were proposed concerning the importance of certain variables in relation to innovativeness. They are listed in shortened form in Table 7-3. It can be determined from the table that the majority of these hypotheses are statistically significant. The hypotheses that were not accepted will be discussed first, followed by the discussion of those hypotheses that were accepted.

Hypothesis Not Indicating Significant Differences. *New firms are more innovative than established firms.* The evidence does not support this hypothesis. While the age of the owner or manager was inversely correlated to PIA, the age of the firm had no relationship to innovativeness. One reason might be that the firms were all relatively young. The median age of the 91 store operations was five years. Additional evidence that this hypothesis is invalid is that Innovation Index #3—Self renewal is not significantly correlated with the other innovation indices or with many other variables.

Innovative firms have more sales growth. This hypothesis was not confirmed. Perhaps it was not confirmed because of the inadequacies in the written records. (Only 11 percent of the respondents referred to written records for data.) Thus, very often the respondents did not remember what sales had been made in an earlier time period. The arbitrarily chosen time period over which sales growth was to be measured was five years, an intermediate time period in U.S. accounting terms. It was obvious, after the field results came in, that in the dynamic Puerto Rican situation, five years was a "long time," since 50 percent of the stores had been founded within that period. Thus, the rejection of this hypothesis is felt to be due to a measure of sales

Table 7-3.—Zero order correlation relationships with two measures of innovativeness

Independent Variable Name	Dependent Variable: Percent Adopted Correlation (PIA) r	Dependent Variable: Year of Adoption Coefficient (AYA) r
Innovative firm managers are younger	.351**	.165*
Innovative firm managers have more education, years school completed	.317**	.246**
Innovative firm managers differ significantly in natural origin:		
Puerto Rico	—.317[ac]	—.286[ac]
Cuban	.350	.181
United States	.084	.131
Innovative firms utilize more government help	.359[a]	.295[a]
New firms more innovative than old established firms	.139	.028
Size of sales	.342	.895
Innovative firms, more sales growth	.000	.097
Innovative firms have fewer suppliers	.495[a]	.300[a]
Innovative firms have greater United States purchases	.122	.153
Innovative firms have great knowledge and use of U.S. prices	.379a	.347a
Innovative firm managers have more political knowledge	.278[a]	.225[a]
Innovative firm managers have more military experience	.235[b]	.215[b]
Innovative firm managers have higher use of mass media	.127	.134
Innovative firm managers have higher government index scores	.410[a]	.351[a]
Innovative firm managers have more mobility	.086	.054
Innovative firm managers have more modern attitudes	—.291[ac]	—.267[ac]
Innovative firms have more educational achievements (for son)	.011	—.034c

[a] Significant at 99 percent level.
[b] Significant at 95 percent level.
[c] Minus (—) indicates more modern.

growth that did not fit the situation in which it was used. The author's belief is that the innovative firms had a much greater rate of sales growth. And, one evidence of this is the rapid growth of the percentage of food sold by corporate stores which are significantly greater adopters of innovation. Again, however, the hypothesis was not supported statistically.

Innovative firms will have fewer suppliers. This hypothesis could not be accepted, even though the correlation coefficient was statistically significant. Correlation is .495 with PIA and .300 with AYA, respec-

tively, which is just opposite from the predicted direction. In other words, the more innovative firms, which were also the larger firms, had more instead of fewer suppliers. The direction and statistical significance of this correlation between number of suppliers and innovative firms is another designation of the lack of vitality of full-line food wholesaling in Puerto Rico.

Innovative firms buy a greater percentage of their merchandise directly from the United States. This hypothesis could not be accepted due to the lack of a statistically significant correlation coefficient. Early evidence from the three largest food retailing firms showed they were dealing directly with U.S. suppliers. This fact led the writer to believe that buying directly must be more profitable and therefore more innovative firms would buy directly from the United States. Such was not the case.

Innovative firm managers will have greater use of the mass media. Many previous studies had indicated that the use of mass media was correlated with innovativeness, yet there was not a statistically significant correlation between innovativeness and a use of a single type of mass media in this study.

Innovative firm managers have greater mobility. One of the more complicated variables, mobility was measured by summing the scores of four questions. Perhaps it was not significant because all Puerto Ricans travel a lot. In our survey, 72 percent of the respondents had been outside Puerto Rico.

Innovative firm managers will want their sons to have more education. This hypothesis is similar to the one concerning mobility. There is little variation in educational aspirations for sons; fathers want their children to have at least a college education and they believe it possible.

Innovative firm managers will have more progressive market attitudes. The market progressiveness index was the summation of nine Likert-type questions asked of all retailers. The questions, which were new as a set of questions, subsequently proved not to be unidimensional, and did not make up a scale. Thus, one of the reasons for this index failing was its methodological inadequacy.

Zero Order Hypotheses That Were Accepted. Although the above-listed eight hypotheses could not be accepted, 13 of the hypothesized relationships presented in Table 7-3 were statistically significant. The profile that one draws of the innovative persons is that he is younger, has more education, is likely to be an *extranjero* (or immigrant), has utilized more government help, has more suppliers, and has a greater knowledge of United States prices.

The variable with the higher r is one that was correlated in the opposite direction. The second-ranking variable, knowledge and assistance of government help, explained only 17 percent of the variance in innovativeness. Thus, not one of the statistically significant zero-order correlations was high enough that a decision-maker would want to take action utilizing these findings as a basis for any major program.

Still, it is notable that the significant correlations are in both economic and social variables. Eight of the 21 independent variables mentioned in the simple correlations are economic in nature and are concerned with the performance of the firm. While only three of the eight are statistically significant, they have higher correlation coefficients than the six of the seven sociological variables. In short, while both economic and social variables are significant, zero-order correlation leaves something to be desired.

Multiple Correlation

Multiple correlation is a statistical method whereby a series of independent variables is related to one dependent variable. Some previous diffusion of innovation studies have utilized multiple correlation to predict innovativeness. Rogers (1962) summarizes the results of a number of such studies through 1962. From 17 to 64 percent of the variations was predicted in those analyses. Since Rogers' book was published, a Diffusion Documents Center has been established at Michigan State University. Annually, the center publishes a bibliography of the empirical studies concerning innovation. Of the 1,000 studies listed in the 1966 bibliography, only 80 had utilized multi-variate statistics including multiple correlation. The explanation variance in innovation studies using multiple correlation extends from a low of 17 percent to a high of 69 percent.

It is interesting to note that in all of those cases where 30 percent or more of the variance in innovativeness has been explained, there is a combination of economic *and* sociological variables.

Hypothesized Relationships. As a result of perusals of the earlier studies, reviews of various theories of social change, and personal in-depth interviews with participants in Puerto Rico, it became obvious that any set of independent variables from a single discipline would have limited predictability. Since the unit that could adopt was the retail food establishment (in most cases a firm) but information was obtained from the owner, manager, or primary decision-maker, we collected both personal and institutional information. The 35 independent variables used to predict innovativeness were broken into the following groups: demo-

graphic, performance, and value orientations and opinions. They are presented in Table 7-4.

Two different measures of the dependent variable were used just as they had been in the zero-order correlations. Innovativeness Index #1 (PIA) was the measure of percentage of innovations adopted. Innovativeness Index #2 (AYA) was a measure of the average time of adoption of the innovations compared to a ranking of other firms that had adopted each of the nine innovations. It is interesting to note that R^2 and $\overline{R^2}$ for the percentage of innovations adopted (PIA) are .875 and .833, respectively. The two measures of explained variance are lower when year of adoption (AYA) is considered. In this case, R^2= .722 and $\overline{R^2}$=.629. Still, the explained variance is among the highest yet reported in studies of innovation.

Table 7-4.—Hypothesized important variables for multiple coorelation with innovativeness

Demographic	*Values orientation and opinion*
City	Personal
Sales by license	Modernization
Neighborhood income level	Trust, would co-sign note*
Age of owner	Risk orientation
Education of owner	Hoarding index*
Income of owner	Educational achievement, son
Nationality	Supers have all business they will get*
Puerto Rican	Government programs help only
Cuban	Competition larger 6 years ago
United States	Index of market attitudes
Performance	Why left business:
Reported sales	Old age
Sales growth	Poor managers*
Percent sales on credit*	Super competition*
Perceived family income of customers	
Number of suppliers	
Percent purchases in U.S.	
Mass media usage*	
Political knowledge	
U.S. prices knowledge	
Government help*	
Mobility*	

* Significant at 95 percent confidence level.

Only 11 of the above hypothesized variables were significant at 95 percent confidence or more in helping explain the $\overline{R^2}$ of .833. Those eleven which explained the most of the variance in innovativeness gave us a picture of the innovator as being a large firm with few if any sales on credit. The manager or owner was well educated, used the mass media widely, was aware of government help and had used it. The manager had traveled widely but rejected the traditional Puerto Rican values of co-signing on loans for a relative. He believed others had gone out

of business because they were poor managers or because of supermarket competition. He felt the supermarket growth was bound to continue and he was ready to invest a windfall into the business or into education. It is evident that there are "economic," "sociological," and "psychological" variables in the above list. Thus, one could conclude that it is necessary to draw upon a number of disciplines in order to increase explained variance in innovations. The hypothesis that predicted that the variables would be statistically correlated is thus accepted on the basis of the high R^2 or .722 and .875. The correlations are significantly different from zero.

USING ZERO ORDER CORRELATIONS AS INDICATORS FOR MULTIPLE CORRELATION. Some researchers (see Campbell, 1965, for an example) have used the zero order correlation coefficients to search out the best predictor for a multiple correlation prediction of a dependent variable. The author went through the various zero order correlations between 183 independent variables and the previously mentioned innovation indices. The 17 independent variables with the highest correlation coefficient that made intuitive sense were chosen for a multiple correlation run with the same two innovation indices used before. Those variables are noted in Table 7-5. It is interesting to note that economic, sociological, and psychological variables all aid the prediction. The explained variance with these 17 variables is $R^2 = .809$ for PIA and .674 for AYA. While still high, it is lower than the explained variance based on hypothesized relations. So, at least in this case, the raw empiricism was not as useful as multiple correlation based upon theoretical relationships.

Table 7-5.—Independent variables with high zero order coefficients used for predicting innovativeness

Demographic	*Values*
Age of business	Luck
Age of owner	Risk orientation
	Supermarkets have all the business
Performance	Government programs, use
Actual sales	
Credit, percent of sales	
Number of suppliers	
Number of employees	
Telephone orders	
Monthly rent	
Persons coming by car	
U.S. price knowledge	
Yesterday media reading	
Discounts taken	
Purpose of training program	

Factor Analysis

We have suggested above that variables associated with any one academic discipline are not sufficient for explaining changes in the complex interacting system within which we live. There is evidence that some better applications of an integrated approach would help. Since computers have become available, the statistical technique of factor analysis makes this conjecture an operational and empirical question.

Factor analysis is a mathematical statistical technique devised some 30 years ago. (Harmon, 1960) Because of the laborious calculations required, factor analysis was never very popular. The cost in time and labor did not usually justify the possible results. Computers have changed that; today a very complicated multifactor solution can be calculated in a matter of minutes.

In factor analysis, one is searching for the kinds of things that cluster on a given mathematically constructed vector. The technique provides the researcher with:

(1) the amount of total variance in the variables under consideration which is explained by each factor;

(2) the amount a given variable contributes to a specific factor;

(3) the "community" or amount of the variance in each variable accounted for by the particular factor solution.

The researcher uses the computer print-out and looks specifically for the particular combination of the highest explained variance combined with the fewest number of factors which makes the most "intuitive sense" and on which the pertinent variables show high loading. Factor analysis is, therefore, useful when one is trying to make certain an index measures one thing and/or when it is desirable to reduce a greater number of variables for purposes of explanation. In this study, the factor analysis was conducted with the same retailers used in the correlation runs discussed earlier in this chapter.

Earlier, the author discussed whether or not the innovation indices measured the same underlying construct. One way to determine whether or not indices measure the same construct is through factor analysis. Basically, Table 7-6 shows that Innovation Indices, 1, 2, and 4 measure the same thing. This can be determined because the three indices are loaded most heavily on the same factor and the communality is higher. Table 7-6 also shows the amount of variance in each index that is explained by the factor analysis.

Listed are the six tables (Table 7-7—Table 7-12) which correspond to the individual factors analyzed. Only those variables which have a loading of .30 or greater are listed. Those variables that have the highest loading and that contribute most to a given factor have the

Table 7-6.—Factor loadings for the five innovation indices

Innovation Indices		Factor						
Name	No.	I	II	III	IV	V	VI	Communalities
% adopted	1	.79	.18	.09	.05	.24	.09	.73
Year of adoption	2	.65	.18	.13	.03	.16	.08	.51
Renewal	3	.01	.13	.14	.11	.08	.02	.20
Perceptual agreement	4	.75	.14	.13	.06	.21	.05	.65
Action vs. perception	5	.12	.10	.14	.10	.35	.04	.18

highest numbers. Also, it should be noted that, contrary to typical experience with factor analysis, no one factor explains more than 10.5 percent of the variance here, yet all six factors explain 42 percent of the variance in these 87 variables in the questionnaire.

By looking over the variables in each factor, names have been assigned which seem indicative of the variables grouped in that factor. Factors I and III describe certain types of firms; factors II, IV, and V describe types of owner-managers; and Factor VI is a combination owner-firm index. The names that have been given each of the factors follow:

Factor I—Modern Firm
Factor II—Modern Businessman
Factor III—Older Stagnant Firm
Factor IV—The Transitional
Factor V—Small Traditional Retailer
Factor VI—Modern Independent

Each will be described in some detail below.

Modern Firm—Factor I. Table 7-7 lists the 22 significant variables which contribute to this factor and explain 10.5 percent of the total variance in the 87 selected variables. Because three innovation indices are loaded on this factor, obviously this is the large innovative corporation. It does a considerable business in United States merchandise, and uses a great amount of advertising. It is more likely to have an *extranjero* as manager rather than a native Puerto Rican.

Modern Businessman—Factor II. This factor is heavily weighted by value orientations and communications behavior. Table 7-8 indicates that this factor explains 7 percent of the variance, yet it does not have one variable from the discipline of economics. There are only three of the eight items of the index of modernization included in this factor. Here, then, is an indication that the modernization index was not single-valued; it appears to have measured more than one concept. (See Factor V for a better indication of the modernization index.)

Tables 7-7.—Modern Firm, Factor I (Variance explained = 10.5%)

Item	Loading
Type of legal organization this establishment has (corporation)	—.49
Square feet of sales area	.61
Merchandise inventory at end of 1964	.30
Total number of people working	.69
Total number of hours worked	.54
Use of posters in showcase	.49
Use of handout sheets	.74
Use of ads in newspapers	.46
Use of ads on TV	.37
Use of loudspeakers for advertising	.64
$ spent on ads and promotion last year	.63
Number of weekly sales transactions	.60
Number of suppliers	.54
Percent of purchases direct from U.S.	.35
Personal family income of manager in 1964	.40
Size as determined from municipal license	.81
Index of knowledge of U.S. prices	.64
Innovation Index No. 1—percent adopted	.78
Innovation Index No. 2—year of adoption	.65
Innovation Indev No. 4—perception agreement	.74
Puerto Rican nationality	—.50
Cuban nationality	.45

Table 7-8.—Modern Businessman, Factor II (Variance explained = 7%)

Item	Primary Loading
Read newspaper yesterday	.46
Newspapers read regularly	.53
Read a magazine yesterday	.50
What magazines read regularly	.55
Knowledge of political leaders	.52
"Children should be instructed to follow ways of past"	—.65
"When a problem arises, one should depend on leaders"	—.67
"I prefer to work alone rather than be tied to family"	.57
"Consumers spend more for platanos when scarce"	—.68
"Increase in income means smaller proportion for food'	—.50
"Milk regulations have benefited business and consumer"	—.61
"Supermarkets have all the business"	—.49
"If friend asked you to co-sign a loan, what would you do?"	.45
Age	—.42
Highest grade passed in school	.45
TV main source for local news	—.32
Loans most important source of funds for expanding	.35

It appears from Factor V that the modernization index identified the traditional person better than the modern person. There are six variables which are attitudes toward events and parameters of the market place. It is rather obvious that this individual would prefer not to have the government regulating his business. He is highly educated, reads a lot, and knows of government assistance, but he does not use it quite as much as Factor III. He is oriented to the future and is willing to borrow money to expand his business. He is optimistic in that he would willingly co-sign a note for a friend.

The Older Stagnant Firm—Factor III. Here is a company in trouble. As indicated in Table 7-9, the owner has faith that the government will help him. His sales have not grown, but he had adopted some innovations as indicated by the index renewal (innovative index #3). He knows about, and has used, government help to a greater extent than anyone else. Five percent of variance is explained by this factor grouping.

As a matter of conjecture, one wonders if this man isn't too old to carry the burden of competition in today's world of business. Perhaps at one time he was progressive. Perhaps he is just about to turn things around, but he is feeling the pressures of competition. He does not believe in the benefits of group action but does believe in price reductions for certain merchandise.

Table 7-9.—Older Stagnant Firm, Factor III (Variance explained = 5%)

Item	Primary Loading
Years business established	.63
Index of sales growth	—.68
"Happy with changes, new better than old"	.32
"Confide only in relatives"	—.42
When dealer reduces prices, less earnings for him	—.45
Egg classification and refrigeration law is wise	.41
When dealer reduces prices, less earning for everyone	—.39
"Group organizations such as buying associations can be beneficial"	—.60
"Government programs benefit select groups of dealers"	—.43
"Five years ago competition was stronger"	—.38
Put a windfall in local bank	—.44
Age[a]	.32
Newspapers main source	.36
Index of government help	.48
Innovation Index No. 3	.40

[a] The primary loading of the variable age was on Factor II. Since it is loaded in the opposite direction, here it is used to better explain this factor.

The Transitional—Factor IV. The variables in Table 7-10 describe a manager who has not yet made up his mind. These items reveal the value orientations of a manager who is not consistent in his values. On

Table 7-10.—Transitional, Factor IV (Variance explained = 5%)

Item	Loading
"Risk and insecurity in selling fruits less today"	—.51
Figures of Department of Agriculture are reasonable and unbiased'	—.33
"Five years ago, competition and pressure were stronger"[a]	.33
Use of windfall income, buy or pay debt on durables	.65
Use of windfall income, education for the family	—.71
Year schooling desired for oldest son	—.37
Newspapers main source for local news	.37
Radio main source for local news	—.69
Radio main source on prices for fruits and vegetables	—.48
Index of agriculture radio effect	—.50
Index of mobility	.54

[a] The primary loading was on Factor III. Since it is loaded about as heavily but in opposite direction it is also listed here.

the one hand, he believes the problems of selling fruits and vegetables are more risky today, but at the same time he claims that general competition was stronger five years ago. He does not want his son to have much education and would not spend any windfall money for additional education, but he would buy durables. The man has traveled a lot, but apparently it is travel without specific business purpose. He claims to get his local news from the newspaper and does not listen to the radio.

Small Traditional Retailer—Factor V. In Table 7-11, we see the portrait of the poorer and less successful businessman. He has his store in a low income section of town. His world view is more traditional. He does not consider himself a continental, i.e., a U.S. citizen. He disagrees most with the "expert" about the innovations that can be applied to his business. He doesn't trust others, believes the market is of fixed size, and that government actions benefit a select group. He believes in luck, an attitude generally associated with traditionalism.

The Modern Independent—Factor VI. This man, as indicated in Table 7-12, is similar to the modern businessman of Factor II, in that he uses the mass media extensively. However, he does not use interpersonal communication. He has not been quite as successful as the man of Factor II. His business has been profitable and he has used the profits for reinvestment in his company. He uses advertisements and he operates in a "better" residential area. He either is a member of a group or believes in group buying. He would be the most likely to continue buying from

Table 7-11.—Small Traditional Retailer, Factor V (Variance explained = 5%)

Item	Loading
Level of income in residential area	—.44
"Better if scientists left things alone"	.41
"Most important thing in life to succeed is luck"	.59
"Things of past are better, changes bring problems"	.34
"Eat, drink and be merry, for tomorrow we may die"	.56
"Consumers only spend a fixed amount on food"	.61
"Government programs benefit select group of dealers"	.40
"If relatives asked to co-sign loans, would you?"	—.57
"How would you invest $10,000 saved from income; savings account"	—.48
Innovation Index No. 5	—.35
U.S. Continental	—.34

a group instead of from a one-shot wholesaler who offers a better price. He believes he can influence his environment. There is a sharp contrast between this type and the traditional manager. Four percent of the variance is explained by the "modern independent businessman" factor.

Table 7-12.—Modern Independent, Factor VI (Variance explained = 4%)

Item	Loading
Listened to radio yesterday	.63
Hours listened to radio in a week	.59
Watched television yesterday	.64
Hours per week watch television	.56
"Better if scientists left things alone"[b]	—.38
Different wholesaler offered $.25 a box less, would you continue buying from regular store?	.33
Interpersonal channels are main source of local news	—.52
Personal savings of inheritances most important source of funds	—.46
Profits from same business most important source of funds	.51

[b] This variable loaded more heavily on other variables, but it helps explain the variance and was included.

Retailer Summary

Innovation has been a byword in Puerto Rico for some time. In food retailing there are differing perceptions of applicability of specific innovations. The statistical analysis, which concentrated upon those stores with more than $12,000 sales and had the added limitation of excluding the establishments of the two largest retailers, was a methodological success. The explained variance of innovativeness was

the highest that has yet been reported. The independent variables were multidisciplinary and represented variables of both the firm and the individual responsible for major decisions in that firm. The simple correlations with innovativeness were of less use than the multiple correlations. Contrary to hypothesized results, the number of suppliers serving a firm increased as innovativeness and size increased. Both multiple correlation and factor analysis helped explain who the innovators were and what kind of variables are associated with those persons or firms most likely to bring about change in food retailing in Puerto Rico. As has been discovered in other studies, the innovator tends to be a well-informed person of younger age, who is meeting with some financial success. More likely than not, he is some sort of foreigner. His business is relatively large so he can afford to fail in his innovations.

PART II. Innovations Among Farmers

Rogers defined an innovation as "an idea which is perceived to be new by the individual." (Rogers, 1962, p. 13) He points out that under this definition innovations might include social movements, clothing fads, the twist, compact cars, and the steel ax. In the context of this study, innovations may include the adoption of new production methods, new marketing methods or new organizational forms for accomplishing either production or marketing. Particularly, emphasis has been placed upon the diffusion process for new agricultural production techniques as it is affected by other variables.

Methodology

The sample of farmers studied was designed to include approximately equal numbers of association members and nonmembers in the Mayaguez agricultural region. The objective was to find out what characteristics, if any, differentiate those who were either selected by government agents for encouragement and assistance or who were personally motivated to seek out and join the new organization. The inference is that those individuals who were chosen or who volunteered to cooperate in these associations had certain socio-economic attributes which qualified them for cooperation in the institutional innovation of a producer association. It should be noted that it may also be possible that the association members experienced changes in their character-

istics as a result of membership in the association. The following is a brief description of the economic characteristics of the 172 farmers included in the sample.

By far the largest farms in the sample were engaged in milk and egg production. While thirteen milk producers each had gross farm sales of more than $180,000 in 1964, nine more had gross farm sales between $50,000 and $100,000. There were three egg producers who had gross farm sales over $50,000. Moreover, several of these large farms showed up in the sample as producers of other products. There were a few fruit and vegetable producers in the sample other than the large farmers mentioned above who had gross sales of over $25,000. But most of the fruit and vegetable producers had gross farm sales of less than $10,000 per year.

This same size ranking appears in the yearly farm sales for individual commodities by farms in the sample. Table 7-13 shows the average and median sales for each commodity group studied in the sample. It points out that milk producers generally had the highest product sales followed by egg producers, and then starchy vegetables, other vegetable and fruit producers. It is also interesting to note that in all cases except

Table 7-13.—Summary of 1964 Sales Data for Farms in a Farmer Sample in the Mayaguez Region ($N = 172$)

	Association Members	Non-Members
	Egg Producers	
Number of Producers	29	26
Average Gross Sales	$11,068.97	$ 8,780.77
Median Sales	8,200.00	4,300.00
	Milk Producers	
Number of Producers	33	24
Average Gross Sales	$35,666.67	$36,616.67
Median Sales	26,200.00	21,650.00
	Starchy Vegetable Producers	
Number of Producers	22	24
Average Gross Sales	$ 1,622.73	$ 591.67
Median Gross Sales	550.00	400.00
	Other Vegetable Producers	
Number of Producers	4	4
Average Gross Sales	$ 725.00	$ 450.00
Median Sales	550.00	350.00
	Fruit Producers	
Number of Producers	23	10
Average Gross Sales	$ 1,547.83	$ 630.00
Median Sales	500.00	400.00

average milk sales, association members have higher average and median product sales than nonmembers.

A combination of production and marketing innovations were chosen for study. Table 7-14 lists the innovations used and the questions asked each farmer with respect to those innovations. Using the information collected from the questions in Table 7-14, two innovation scales were constructed.

Innovation scale # 1 was computed by dividing the number of applicable practices adopted by the total number of applicable practices for each respondent. This scale simply shows the percentage of innovations adopted by the farmer out of all those perceived by him as applicable on his farm (PIA).

Table 7-14.—Production and Marketing Practices Used in Making Up the Index of Innovativeness and Questions Asked Each Respondent

(a) Is the practice applicable on your farm?	Innovations
(b) In what year did you begin using the practice, if at all?	1. Fertilizers
(c) Are you using the practice now?	2. Insecticides
(d) If adopted but not in use, why did you stop using it?	3. Classifying and grading products
	4. Special handling and packing to prevent quality damage and product loss
	5. New varieties or breeds in your principal farm enterprise
	6. Buying group
	7. Contracts with buyers
	8. Marketing group

Innovation scale #2 is an indicator of the earliness of adoption of innovations in the study by individual farmers. The year of adoption was converted into a percentile scale for each innovation. Applicable innovations were then employed to compute an average percentile score for time of adoption for each respondent (AYA).

It was decided after examination of the relationships between the two scales and other variables that innovation scale #1, for purposes of this study, gave a more accurate indication of innovativeness than the second scale. Although innovation scale #2 has the advantage of taking into consideration the time of adoption as well as the act itself, it also introduces the possibility that a younger farmer who began using all the innovations six years ago when he first started farming may receive a lower score than the older farmer who adopted relatively few innovations 25 years ago. Studies have shown (and it is supported in this study) that younger farmers do tend to be more innovative. The simpler percentage of applicable innovations adopted thus gives a better indication of the act of adoption which is the relevant concept for this study.

Independent Variables

The other variables used in the analysis cover a wide range of socio-economic factors.

Economic variables include such things as gross farm sales, value of farm holdings, farm sales growth over the past five years, and size of the farm.

Demographic variables are those concerned with the physical and educational characteristics of the respondent and his family. Examples of these variables are age, education, size of family, place of residence, and religion.

Communication variables are those providing information describing the channels, sources, and nature of information received by the respondent. Illustrations are newspapers read, membership in farm organizations, source of market news, etc.

The *Attitude* variables are made up of a series of statements with which the respondents were asked to indicate their agreement or disagreement on a five-point scale. The individual's response was taken as an indicator of his attitude with respect to such things as luck, scientific inquiry, product grading, cooperatives, etc.

Prediction of Innovativeness

Zero-Order Correlation Tests

Hypotheses were formulated to predict that innovativeness would be significantly correlated (either positively or negatively) with certain of the other variables. In the section below the results are discussed.

Innovativeness scale #1 was correlated across all 172 respondents with many of the same variables mentioned above in addition to others. In Table 7-15 the results are given along with the name of the variable and hypothesized relationships. A double asterisk denotes the statistically significant (at the .01 level) correlations.

The group of variables listed under *modernity* was designed to indicate the world view of the respondent. The conceptual basis and some of the questions were derived from earlier work by Kluckhohn and Strodbeck (1961) and by Otis Oliver (1963). The earlier work had pointed out that modernism might be indicated by the values and attitudes held by an individual. Kluckhohn and Strodbeck commented that values held with respect to the following "orientations" suggest the degree to which an individual will be receptive to new ideas and a changing environment: (1) human nature orientation, (2) man-nature orientation, (3) time orientation, (4) activity orientation, and (5) relational orientation. A series of seven agree-disagree statements was

Table 7-15.—Hypothesized Relationships Between Innovativeness[a] and Other Socio-Economic Variables, Correlations Obtained and Statistical Significance of Each

Variable Name	Coding Used in Correlation Matrix	Hypothesized Relationship	Simple Correlation
	Modernity		
Modernity index	(Range = 07, Lower values indicate modernity and Higher values traditionalism	—	—.20**
New customs better than old ones	(1=strongly disagree, 5=strongly agree)	+	.04
Let leaders solve problems	(1=strongly disagree, 5=strongly agree)	—	—.22**
Scientists leave things alone	(1=strongly disagree, 5=strongly agree)	—	—.11
To get ahead—be lucky	(1=strongly disagree, 5=strongly agree)	—	—.13
Farmers can't do much to change things	(1=strongly disagree, 5=strongly agree)	—	.19
Ways of past better	(1=strongly disagree, 5=strongly agree)	—	—.08
Eat, drink and be merry	(1=strongly disagree, 5=strongly agree)	—	—.12
	Familism		
Can only confide in family	(1=strongly disagree, 5=strongly agree)	—	—.27**
Prefer to work alone	(1=strongly disagree, 5=strongly agree)	+	.02
	Attitude Toward Government		
Egg grading regulations good	(1=strongly disagree, 5=strongly agree)	+	.23**
Milk regulations beneficial	(1=strongly disagree, 5=strongly agree)	+	.09
Count on government help	(1=strongly disagree, 5=strongly agree)	+	.13
Government program help politically influential	(1=strongly disagree, 5=strongly agree)	—	.09
	Marketing		
Farmers should let others do marketing	(1=strongly disagree, 5=strongly agree)	—	.14
Not wise to deal directly with retailers	(1=strongly disagree, 5=strongly agree)	—	.07
	Communications		
Index mass media exposure	(0=exposure, 12=high exposure)	+	.28**
Index political knowledge	(0=low, 7=high)	+	.34**
Number farm magazines read		+	.13
Talk to friends of new techniques	(0=no, 1=yes)	+	.01

Member co-op	(0=no, 1=yes)	+	.14
Member other agricultural organizations	0=no, 1=yes)	+	.23**
Member other organization	(0=no, 1=yes)	+	.20**
Index economic isolation	(0=most isolated 12=least isolated)	+	.30**
	Self Perception of Innovativeness		
Do friends think you adopt first	(0=no, 1=don't know, 2=yes)	+	.03
	Cooperativism		
Would you share equipment	(0=no, 1=yes)	+	—.09
Would you help with community project	(0=no, 1=yes)	+	—.12
	Risk		
Effect of 50% output reduction due to technological innovation	(1=borrow money, 6=quit farming—move to city)	—	—.10
Investment risk	(0=low risk, low profit, 1=somewhat risky, high profit)	+	.14
Use insurance	(0=no, 1=yes)	+	.12
	Farm Business		
Gross farm sales 1964	(Dollars)	+	.07
Index of sales growth	(% growth 1959-64)	+	.31**
Acres in farm 1964		+	.06
Farm and equipment value	(Dollars)	+	—.04
Family income	(Dollars)	+	.15
Additional non-farm income	(Dollars)	—	.08
	Age and Education		
Age	(Years)	—	—.29**
Education	(Years)	+	.28**
Education for son index	(0=low aspiration for son, 5=high aspiration)	+	.18**
	Investment		
Invest in farm improvement	(Choice of 8 alternatives to invest $500)	+	—.18
Invest in non-farm business	(Choice of 8 alternatives to invest $500) (0=no, 1=yes)	—	.20
Invest in family education	(Choice of 8 alternatives to invest $500) (0=no, 1=yes)	+	.21**
Hide money	(Choice of 7 alternatives to invest amount equal to annual salary)	—	—.18**

[a] The range of the variable innovativeness in 0-100 where larger numbers indicate a greater tendency to innovate.

** Statistically significant at the .01 level.

designed to explore these orientations. The results of those responses were combined to yield an index of the degree to which individual's attitudes indicates "modernism." The modernity index in which a high score indicated traditional views was significantly worth innovativeness with an r of —.20. The only one of the individual items making up the index which revealed a significant correlation was a statement suggesting that people should depend upon community leaders to solve common problems.

Two other variables which were included in the modernity index are listed under *familism* in Table 7-15. It was hypothesized that the more innovative individuals would be those who depended less on extended family support and more on the self. A feeling that people other than family members can be trusted was found to be significantly correlated (—.27) with innovativeness.

It was hypothesized that a favorable attitude toward government assistance would correlate with innovativeness. But only one of the four attitudes toward government variables was statistically significant. The simple correlation between an agree-disagree statement suggesting that the government egg grading regulation had proven to be beneficial was + .23.

None of the hypotheses relating *marketing attitudes* to innovativeness could be accepted. Since five of the eight innovations used in the innovation index were marketing practices, this was somewhat surprising. This information seems to support earlier conclusions that Puerto Rican farmers do not completely understand the vital interrelationships between production and marketing, or it may also indicate that the farmers are not innovative.

The set of variables showing the highest general correlations with innovativeness were those labeled *communications*. The first variable is an index computed for each individual by combining in index form his regular weekly exposure to various mass media (radios, newspapers, television, and magazines). That index of mass media exposure was significantly correlated with innovativeness (r = + .28). The correlation of + .34 for an index of knowledge about political leaders is also a reflection of the amount of communication exposure and its effect on innovativeness. It is interesting to note that "talking to other farmers about new farming techniques" did not show a statistically significant correlation to innovativeness. The correlations for belonging to cooperatives (+ .14) and other organizations (+ .23) were statistically significant. The index of economic isolation was prepared by considering the distance of the farmer from a village, the number of visits per week to the village, the type of road, and whether or not the

farmer lived on his farm. Economic isolation was significantly correlated with innovativeness (+.30) suggesting that the ability of the farmer to get off his farm and into a city or village is strongly related to innovativeness.

In earlier chapters, we frequently referred to the importance of perceived risks and uncertainties in the marketing system. It was not possible to derive a satisfactory method of measuring the impact of such uncertainties in this study. But three statements were used in an attempt to get some indication of the effect of business risks in general on the individual farm business. Though the correlations of these three variables with innovativeness were in the direction hypothesized, they were not large enough to be statistically significant at the .01 level. The first question asked the respondent to indicate what he would have to do if his adoption of an innovation caused a 50 percent decrease in his total output. The alternatives ranged from the least damaging "borrowing money" to the most serious "sell out and move to the city." The simple correlation between this variable and innovativeness was —.10. The second risk question asked the respondent to state how he would invest $10,000; he was offered a highly lucrative but somewhat risky alternative and a low-yielding but completely safe alternative. The simple correlation with innovativeness was +.14. Finally, respondents were asked if they had farm, home, crop, or livestock insurance ($r = +.12$).

The group of variables under the *farm business* heading includes a number of variables relating to the size and success of the farm unit in economic terms. Only sales growth showed a statistically significant correlation with innovativeness. But this relation was quite strong (+.31), showing that those farmers who are using new techniques have realized farm sales increases over the past five years. It is somewhat surprising that the simple correlation between innovativeness and gross sales for 1964 was only .07 and that the relationship between value of farm holdings and innovativeness was negative. This might be due to several very large estates included in the sample where there is absentee ownership and where managers are regarded as somewhat conservative and uninterested in production improvements.

As other innovation studies have shown, *age and education* were highly correlated with innovativeness. In addition, the respondents were asked to indicate what level of education they would like their eldest son to have and whether they thought it possible to achieve. An index was devised using the two questions, and it correlated significantly with innovativeness (+.18). This gives an indication of the respondent's achievement motivation as reflected through educational aspirations for his son.

Finally, the *investment* variables indicate the relationships between the predispositions for investment alternatives and innovativeness. It was found, contrary to the hypothesis, that there was a strong negative relationship of — .18 between "invest in farm business" and innovativeness and a positive relationship of .20 between "invest in nonfarm business" and innovativeness. Perhaps this only reflects the ability of innovative producers to perceive the many profitable nonfarm investments available in the booming Puerto Rican economy in comparison to the sluggish agricultural sector.

In summary, there is a significant relationship between certain kinds of socio-economic variables and innovativeness. The correlations suggest that some kind of modernity test may be useful for predicting innovativeness when used in conjunction with other variables such as age, communications, business growth variables, investment preferences, and perhaps some other variables such as risk perception, cooperativism, and marketing attitudes if they can be better operationalized for quantitative research methods. To explore the possibilities, a multiple correlation analysis was performed using, as a dependent variable, innovativeness and as the independent variables a combination of socio-economic variables which had shown the greatest correlation to innovativeness in the simple correlation matrix of all factors. The results are examined in the following section.

Multiple Correlation

The simple correlation analysis implied that it might be possible to predict association membership and especially innovativeness with certain independent variables. To explore that possibility, the variables highly correlated with association membership and innovativeness were used as independent variables in multiple correlation equations. For association membership, the 29 most highly correlated variables were used in a least squares delete program on the CDC 3,600. The innovativeness analysis started with 34 independent variables.*

In deciding which independent variables should be included in the reported equation, the following criteria were used. (1) The co-efficient

* The least square delete program is designed to first perform a least squares analysis using the initial 34 variables. Then the variable making the least contribution to the variance of the dependent variable is deleted and a new least squares analysis is performed. This process is continued until sufficient variables have been deleted to produce a least squares result corresponding to the objective criteria formulated by the researcher and included in the computer program. This permits the researcher to determine which variables make the least contribution to the variance of the dependent variable and omit them, while selecting the least squares equation deemed most appropriate for predicting variability in the dependent variable.

of multiple correlation (R^2) should be as large as possible. (2) At the same time the co-efficient of multiple correlation corrected for degrees of freedom ($\overline{R}^2$) should also be as high as possible (this permits the researcher to observe "explained variance" after spurious correlations due to large numbers of independent variables which have been removed). (3) The standard error of the estimate should be as low as possible. (4) The independent variables should have logical theoretical relationships to the dependent variable. The multiple correlation results are discussed below.

The multiple regression equation containing the 34 variables with the highest simple correlation with innovativeness had an $\overline{R}^2$ of .45. But $\overline{R}^2$ was only .32. By deleting 14 variables which contributed little to the explained variance, a least squares equation was obtained with an $\overline{R}^2$ of .44 and an $\overline{R}^2$ of .36. This means that the 20 independent variables shown in Table 7-16 accounted for about 44 percent of the variance in innovativeness among farmers in the sample.

Table 7-16 presents the results of the multiple correlation analysis. Seven of the twenty regression coefficients are significantly different from zero at the .05 level. The independent variables are grouped under four major headings: communication, demographic, value orientations, and farm business. The reader should note that many of the variables contributing to the explanation of innovativeness in the multiple correlation are the same as those found significantly related in the simple correlation tests. On the other hand, several new variables appear in the analysis.

In conclusion, there is evidence that multiple correlation methods using communication, demographic, attitudinal, and economic concepts as independent variables can be utilized to predict innovativeness. An $\overline{R}^2$ of .44 was obtained using 20 such independent variables. However, in order to improve "explained variance," there is a definite need to define more explicitly variables related to innovativeness and to improve the measurement of variables used in this study. As a step toward that goal, a factor analysis was performed; the results are discussed in the following section.

Factor Analysis

The conclusions of the bivariate analysis and multiple correlation analysis indicate that innovativeness can be predicted using certan independent variables. But additional research needs to be directed toward uncovering other significant independent variables and improving the measurement of those used in this research. To that end an exploratory factor analysis was performed using 90 of the 201 variables used

Table 7-16.—Summary of Innovativeness—Multiple Correlation

Independent Variables	Dependent Variables % of applicable innovations adopted R^2=.44; $\bar{R}^2$=.36	
Name	Regression Coefficient	Significance
Communication		
Mass media exposure	— .865	.19
Listened to radio yesterday	1.951	.30
Read a newspaper yesterday	1.351	.16
Index of market news use	— 5.694	.01*
Help from Department of Agriculture radio program	4.445	.09
Personal contacts principal source of local news	—12.649	.02*
Member of non-agricultural organizations	5.188	.08
Demographic		
Live on farm all year	— 1.359	.30
Age	— 1.335	.19
Value Orientations		
Modernity index	.915	.01*
Can only confide in relatives	— 4.022	.00*
Let leaders solve problems	— 1.630	.19
Consumers spend more on platanos in periods of scarcity	— 1.522	.25
Index of consumer demand knowledge	— 1.502	.09
Egg grading regulation good	1.558	.33
Supermarkets have all the business they can get	— 1.154	.33
Too much foreign competition	7.481	.05*
Invest in business other than farm	.019	.08
Hide money in a safe place	—14.086	.05*
Farm Business		
Index of sales growth	.077	.03*

* Denotes those variables significant at the 95 percent confidence level or better.

in the survey questionnaire. Those variables judged most useful in describing and differentiating farmers in the sample in terms of willingness to change and innovate were selected for factor analysis. These variables again represented various aspects of economic and marketing behavior, demographic characteristics, communication behavior, and individual attitudes.

In this study the purpose of the factor analysis was to explore relationships existing among the variables in order to determine the number and nature of the factors underlying the 90 items used in the field survey. Factor analysis may provide us with additional information about the "real" factors underlying the variables and the relationships existing between those factors and between the variables that make them up.

In order to decide which of the ten solutions most nearly described the constructs underlying the 90 variables, the following decision criteria were used. The ideal solution should: (1) explain a high percent of the variance of the variables in the study, and each factor should contribute a significant percent to that explained variability (this refers to variance in the factor columns); (2) indicate "pure" factor loadings (i.e., a variable correlating highly with one factor should not have particularly high correlation with other factors); (3) have a high level of communality (i.e., all factors together should account for a high percentage of the variability in a single variable—this, then, refers to low variance); and (4) have a logical explanation in theory and practice as judged subjectively by the researcher. On the basis of these criteria, an eight-factor solution was chosen. The proportion of variance of all the variables explained by the eight factors was 41 percent.

Table 7-17 lists the variables and factor loadings for the first factor, which explained 9.15 percent of the variance in all the variables included in the analysis. For each of the eight factors, names were devised to indicate the concepts believed to be underlying the related variables.

The names given each of the eight factors are:

Factor I—Modern Farmer
Factor II—Anti-Innovation (Economic)
Factor III—The Transitional
Factor IV—Anti Innovation (Marketing)
Factor V—The Cooperator
Factor VI—The Traditional
Factor VII—The Isolate
Factor VIII—The Fatalist

Each will be described in some detail below.

Modern Farmer—Factor I. The high loading on the political knowledge index (+ .75) and mass media exposure variable (+ .76, +75, +.65 and + .62) suggests that these kinds of indices can offer an indication of the communication aspect of modernism. For purposes of detecting modernity, one could simply measure political knowledge and determine the number of magazines and newspapers read regularly.

In addition to the high loading (+ .75) of years in school on the modernism factor, an index of education aspiration for a son loaded + .56 on the factor. Hence, education and educational achievement appear to be important variables in measuring modernism.

Total family income had a factor loading of + .55, and the index of economic isolation had a factor loading of + .54, indicating that the degree of personal exposure to other individuals and economic well-

Table 7-17.—Modern Farmer, Factor I (Variance Explained = 9.15%)

Variable Name	Primary Factor Loadings
Read newspaper yesterday (0=no, 1=yes)	.76
Highest grade reached in school (years)	.75
Political knowledge index (0=low knowledge, 7=high knowledge)	.75
Newspapers read regularly	.75
Newspapers major source of local news (0=no, 1=yes)	.65
Number magazines read regularly	.62
Index of economic isolation (0=most isolated, 12=least isolated)	.54
Total family income in 1964 (dollars)	.55
Index of educational aspiration (0=low achievement aspiration for son, 5= high)	.56
Additional non-farm income (dollars)	.47
Mobility index (0=least mobile, 4=most mobile)	.47
Most important thing in life to succeed is luck (1=strongly disagree, 5=strongly agree)	—.47
Radio major source of local news (0=no, 1=yes)	—.43
Better if scientists left things alone (1=strongly disagree, 5=strongly agree)	—.45
Age (years)	—.41
Read any magazine yesterday (0=no, 1=yes)	.44
Children to be instructed to follow ways of past (1=strongly disagree, 5=strongly agree)	—.39
Things of past are better, changes bring problems (1=strongly disagree, 5=strongly agree)	—.37
Number dependent on family income	—.36
Would dedicate 50 hours to community improvement (0=no, 1 =yes)	—.35
Total sales value of farm (dollars)	.31
Mass media principal information source in selling starchy vegetables (0=no, 1=yes)	—.34

being are correlated with modernity. The factor loadings of other similar variables in Table 7-17 support this conclusion.

A third group of variables concerned with attitude loads fairly high on this factor. Six of the nine attitude variables designed originally to measure modernity show factor loadings of + .25 or more with this factor.

Anti-Innovation (Economic)—Factor II is illustrated in Table 7-18. It is quite clearly a factor reflecting innovation. Since negative loadings are most prevalent, it is labeled anti-innovative.

Factor II includes only production innovations (i.e., fertilizer, insecticides, and improved breeds or varieties) in addition to several

Table 7-18.—Anti-Innovation (Economic), Factor II (Variance Explained = 6.13%)

Variable Name	Primary Factor Loadings
Acres farmed	—.75
Fertilizer in use now (0=no, 1=yes)	—.62
Radio, newspapers, trucks, and non-farmers main source of information in selling livestock (0=no, 1=yes)	.60
Farmer's main source of information in selling cattle (0=no, 1=yes)	—.55
Monthly food expenditure for family (dollars)	—.51
Using selling groups now (0=no, 1=yes)	—.49
Index of innovation influence (0=low influence, 4=high influence)	—.47
Total sales value of farm (dollars)	—.45
Insecticides in use now (0=no, 1=yes)	—.42
Using improved varieties or breed in principal farm enterprise (0=no, 1=yes)	—.39
Total family income in 1964 (dollars)	—.36
Number of newspapers read regularly	—.35
Prices determined mostly by big processors and retailers (1=strongly disagree, 5=strongly agree)	—.35
Use insurance (0=no, 1=yes)	—.30

variables loading significantly on this factor which were indicators of farm size, sales, and other economic characteristics. Factor II is relatively pure. The factor explains 6 percent of the variance among the 90 variables.

Transitional—Factor III. Table 7-19 gives factor loadings for the third factor. It was somewhat difficult to label this factor since the loadings were low and primarily negative, and secondary loadings were numerous. The negative correlations between the factor and three radio variables suggest low mass media orientation, but the positive correlations between the factor and educational aspirations suggest a more modern leaning. Thus, this factor seems to indicate a state of transition for certain respondents.

Anti-Innovation (Marketing)—Factor IV. The loadings for Factor IV are given in Table 7-20. Like Factor II, this one is relatively pure with fairly high primary factor loadings. However, here all but three of the variables are innovation measures and specifically marketing innovations.

The Cooperator—Factor V. This factor should not be interpreted as measuring only participation in cooperative businesses. It appears to

Table 7-19.—Transitional, Factor III (Variance Explained = 4.36%)

Variable Name	Primary Factor Loadings
Non-farmers, truckers, and co-ops main sources of information in selling fruits (0=no, 1=yes)	—.58
Listened to radio yesterday (0=no, 1=yes)	—.58
Hours listened to radio per-week	—.49
When dealers reduce prices, less profit for everyone (1=strongly disagree, 5=strongly agree)	.45
Market visit principal source of information in selling starchy vegetables (0=no, 1=yes)	.44
As family income increases, smaller proportion spent on food (1=strongly disagree, 5=strongly agree)	—.39
New customs usually better than old ones (1=strongly disagree, 5=strongly agree)	.39
Close relative asked you to cosign loan what would you do (0=no, 1=yes by obligation, 2=yes)	.38
Farmer's main source of information in selling fruits (0=no, 1=yes)	—.35
Acres farmed	.34

be a broader concept including significant loadings on attitudes toward government, relatives, friends, and retailers, as well as cooperative marketing and value orientations. The negative correlation (— .35)

Table 7-20.—Anti-Innovation (Marketing), Factor IV (Variance Explained = 4.65%)

Variable Name	Primary Factor Loadings
Innovation index number 5 (% of innovations perceived applicable, range = 0-100)	—.71
Innovation index number 1 (% of applicable innovations adopted, range = 0-100)	—.68
Packing in use now (0=no, 1=yes)	—.64
Selection and classification in use now (0=no, 1=yes)	—.58
Farmers main source of information in selling poultry (0=no 1,=yes)	—.49
Contracting with buyers now (0=no, 1=yes)	—.43
Association membership (0=non-member, 1=member)	—.43
Using improved varieties or breed in principal farm enterprise now (0=no, 1=yes)	—.39
Big supermarkets, use buying power to maintain low prices, (1=strongly disagree, 5=strongly agree)	—.39
Using buying group (o=no, 1=yes)	—.37
Innovation index #2 (average precentile rank of farmer based on innovatioon use and time of adoption, range = 0-100)	—.36

Table 7-21.—The Cooperator, Factor V (Variance Explained = 4.75%)

Variable Name	Primary Factor Loadings
Grading and refrigeration of eggs is wise regulation (1=strongly disagree, 5=strongly agree)	.62
Believe future buyers will increase use of contracts (1=strongly disagree, 5=strongly agree)	.59
Figures of Agriculture Dept. on prices are reasonable (1=strongly disagree, 5=strongly agree)	.52
Government programs beneficial only for select group of dealers (1=strongly disagree, 5=strongly agree)	.51
If friend asked you to cosign loan, would you do it? (0=no, 1=yes by obligation, 2=yes)	.49
Farmers should be organized in groups to bargain (1=strongly disagree, 5=strongly agree)	.47
Milk regulations benefited the industry and consumers (1=strongly disagree, 5=strongly agree)	.46
Better if scientists left things alone (1=strongly disagree, 5=strongly agree)	—.46
Farm tenure (1=owner, 2=renter, 3=manager, 4=sharecropper)	—.38
Can count on government to resolve marketing and price problems (1=strongly disagree, 5=strongly agree)	.36
Organization of groups or co-ops can be beneficial (1=strongly disagree, 5=strongly agree)	.35
Effects of 50 percent output reduction due to innovation (1=borrow money, 5=quit farming, move to city)	—.35
Not wise for farmer to bargain directly with retailers (1=strongly disagree, 5=strongly agree)	—.31

with "effects of a 50 percent output reduction" implies that cooperativism may be related to the individual's perceptions of his financial ability to remain solvent in the face of economic catastrophes.

The Traditional—Factor VI. Again, it was somewhat difficult to logically sort out the variables loading on this factor in order to ascertain the underlying concept being tapped. There are several loadings which point to traditionalism in terms of attitudes. On the other hand, there are three variables with correlations indicating progressive marketing attributes. Future research should be directed toward operationally improving some of the variables in order to purify the factor.

The Isolate—Factor VII. The two highest loadings are on television exposure and are negative, implying a measure of low communication exposure. The loadings suggest measures of individualism.

The Fatalist—Factor VIII appears to be primarily related to *fatalism* (see Table 7-24): The two most highly loaded variables hint at low credit availability and perceptions of high risks in certain farm enter-

Table 7-22.—The Traditional, Factor VI (Variance Explained = 3.97%)

Variable Name	Primary Factor Loadings
Prefer to work alone than be tied to family (1=strongly disagree, 5=strongly agree)	—.62
One can only confide in relatives (1=strongly disagree, 5=strongly agree)	.53
Farmers should let others take care of marketing problems (1=strongly disagree, 5=strongly agree)	—.51
Grading and packaging are waste of time for farmers (1=strongly disagree, 5=strongly agree)	—.50
Eat, drink and be merry, for tomorrow we may die (1=strongly disagree, 5=strongly agree)	.43
Risk and insecurity in produce market much less today than 10 years ago (1=strongly disagree, 5=strongly agree)	.42
Market visits principal source of information in selling starchy vegetables (0=no, 1=yes)	.40
Believe future buyers will increase use of contracts (1=strongly disagree, 5=strongly agree)	.36
Farmers principal source of information in selling fruit (0=no, 1=yes)	—.30

prises. "Farmers can't do much to change things," shows a loading of .40. Loadings on variables like "big supermarkets use buying power to hold prices down" and "farmers should be organized in bargaining groups" imply a likelihood of resignation to accept and even "overemphasize" bad farming conditions.

In general, the results show that factors I, II, IV, V, VII, and VIII, though somewhat interrelated, were measuring specific underlying

Table 7-23.—The Isolate, Factor VII (Variance Explained = 4.01%)

Variable Name	Primary Factor Loadings
Hours TV watched per week	—.76
Watched TV yesterday (0=no, 1=yes)	—.63
Asked more often for information than others (0=less, 1=don't know, 2=more)	—.48
Truckers, farmers, non-farmers and coops principal source of information in selling starchy vegetables (0=no, 1=yes)	.44
Member of any co-op (0=no, 1=yes)	—.43
Television major source of local news (0=no, 1=yes)	—.42
Market visits principal source of information in selling poultry (0=no, 1=yes)	—.39
Big supermarkets use buying power to maintain low prices (1=strongly disagree, 5=strongly agree)	.38
Index of economic isolation (0=most isolated, 1=least isolated)	—.36

Table 7-24.—The Fatalist, Factor VIII (Variance Explained = 3.87%)

Variable Name	Primary Factor Loadings
Get credit from dealer from whom buy major part of farm supplies (0=no, 1=yes)	—.61
Index of perceived risk (0=low perceived risk, 6=high)	.56
Index of perception of main farm problems (problems perceived range = 0-11)	—.48
Consumers spend more on platanos during scarcity (1=strongly disagree, 5=strongly agree)	—.46
Supermarkets have all the business they will get (1=strongly disagree, 5=strongly agree)	—.45
Share equipment with neighbors (0=no, 1=yes)	.45
Farmers cannot do much to change things (1=strongly disagree, 5=strongly agree)	.40

factors which could be easily identified. The strength of factor loadings for individual variables in each factor and between factors gives some indication for further research in operationalizing variables to more accurately measure those concepts for eventual predictive purposes.

Conclusion

The tests of innovativeness proved quite useful in both the study of retailers and the study of farmers. Bivariate analysis of variables associated with innovativeness proved to have much less value than the multivariate analysis using both multiple correlation and factor analysis.

An attempt was made to develop some new indices of innovativeness, but more work is required before they can be useful methodological tools. Thus, we continued to use those indices that have been used previously: percentage of innovations adopted (PIA) and average year of motivation (AYA). In addition, attitudes were measured. In measuring modernism, the cause of scientific parsimony may be served by including only variables determining political knowledge plus regular exposure to the various mass media.

Efforts should be made to operationally improve the variables measuring cooperativism. The factor analysis suggested that the individual's capacity to withstand financial losses is correlated with cooperativism, and this hypothesis should be submitted to further testing. Two of the eight factors in this analysis indicated some relationship to individualism (isolated individualism and traditional individualism). Perhaps specific variables could be designed which would more accurately

tap an individualism factor. This factor should not necessarily be considered as the antithesis of cooperativism since it apparently measures a different concept in which an individual might possibly be consistent and still score fairly high on both factors.

VIII. CONCLUSION AND POLICY RECOMMENDATIONS

Throughout the developing nations, much interest is focused on programs which promise greater productivity. Usually the primary goal (if one exists) is to bring about an increase in capital saving and to encourage the investment of that capital in technological (or even organizational) innovations which will lead to a greater output per unit of inputs. Simply stated, the goal is greater efficiency of resource use through the application of modern techniques. T. W. Schultz has argued rather convincingly that there is relatively little hope of achieving productivity gains in traditional agriculture through more efficient combinations of existing resources. He concludes: "The key to growth is in acquiring and using effectively some modern. . . factors of production." (Schultz, 1964, p. 176)

Schultz's observations are probably applicable to all sectors in the developing economy, if they are stated in a somewhat more general way. Most development economists would agree that the task of stimulating economic development is basically that of procuring a self sustaining growth process characterized by more and more intensive use of improved technologies made more effective through improved institutional arrangements. While many technological improvements are readily available and obtainable from developed nations, the development of facilitating institutional arrangements and the direct application of such technologies requires men of wisdom, courage, and innovative ambition. The case of Puerto Rico helps to illustrate these points and suggests that efforts to improve marketing productivity and coordination can play an active part in the development process.

Atomistic Competition and Economic Growth

Several years ago Sol Tax made an intensive study of the population of an isolated village in Guatemala. He found that with respect to the economic system, there was considerable specialization and exchange. He also found that the market place could be characterized as purely competitive insofar as it tends to be (a) atomistic, (b) open, (c) free, and (d) based on rational behavior. In this "purely competitive" system, he found that living standards were extremely low; and the people were able to produce only the basic necessities to maintain life. Moreover, he found that despite increasing specialization and exchange, the economy had been stalled for some time at this low level of economic life. Tax asked, "Why does the fact that everybody works hard for himself alone, and seeks to maximize his own rewards, not have the effect of creating wealth for all?" (Tax, 1963, p. 28) Pure competition seemed to prevail in the economy, but there were no evidences of economic advancement. Yet pure competition is frequently posited as a stimulus to efficient allocation of resources and economic growth. In answer to his own question, Tax concluded: "What seems to be lacking in Guatemala is the beginning of the accumulation of technical knowledge that eventually results in improvement in the material standards of life." (Tax, 1963, p. 28)

> If economists had been living in western Guatemala the past two hundred years, they could not have credited to free competition the glory that progress in technology has deserved. (Tax, 1963, p. 29)

Although Tax's statement is strong, his point is valid. Advancing technology is a critical factor if greater productivity and economic growth are to be achieved. A vital point which he failed to consider, however, is the adverse effect of atomistic competition on the spread of new techniques of production. A recent anthropological study in Southern Italy indicates that small-scale atomistic competition tends to create pessimism and a complete lack of trust for the unknown and even for one's fellow man—a condition hardly conducive to innovativeness.

Edward Banfield spent nine months studying the culture and economy of Montegrano, an extremely impoverished village in Southern Italy. His description of the economy was not as thorough as the one given by Tax for his Guatemalan village, but it is obvious that considerable degree of specialization and exchange existed. He reported that atomistic competition was the rule, and that it was accomplished by a very strong feeling of self-preservation. And, he made it clear that the

people lived just at the level of subsistence. The rule prevailing in all social and economic relationships was to "maximize the material, short-run advantage of the nuclear family (the most prevalent form of business organization); assume that all others will do likewise." (Banfield, 1958, p. 85) He hypothesized that obedience to this rule leads to complete lack of cooperation among the people in achieving social improvements.

The probable factors leading to "amoral familism" are not discussed by Banfield. However, his findings suggest that many generations of atomistic competition and poverty with little advance in technical knowledege resulted (perhaps justifiably so) in the destruction of any real hope for the individual to improve his position through new and risky methods or cooperative ventures. Banfield describes the peasant:

> "Getting ahead" and "making a good figure" are two of the central themes of the peasant's existence. But he sees that no matter how hard he works he can never get ahead. Other people can use their labor to advantage, but not he. (Banfield, 1958, p. 65)

Of 320 peasants, who were given thematic apperception tests, only sixteen described a situation where a family was able to "prosper by thrift or enterprise, and even in these cases the success was not great enough to raise it out of the peasant class." (Banfield, 1958, p. 66)

Banfield concluded that "amoral familism" was the primary factor preventing economic development in Montegrano. He generalized to other developing nations:

> Lack of such association (i.e., political and corporate) is a very important limiting factor in the way of economic development in most of the world. Except as people can create and maintain corporate organization, they cannot have a modern economy. To put the matter positively: the higher the level of living to be attained, the greater the need for organization. (Banfield, 1958, p. 7)

Recently Cyril Belshaw observed peasant markets in Fiji and New Guinea and reported that agricultural producers were initiating specialized production but with little reference to marketing. There were large numbers of traders competing atomistically:

> The large numbers, the strength of the competition, the relative weakness of the prestatory links which should create monopolistic frictions, combine to keep capital accumulation to the minimum. This in turn limits the internal growth dynamic of the system. (Belshaw, 1963, p. 82)

He enumerated the conditions necessary to bring vitality to the peasant market. "One would be. . . a reduction in numbers of traders relative to the volume of trade, giving a trader a chance to achieve economies of scale. . . [and] advantages to the alert can accrue through the sudden widening of the transportation network." Finally, he recommends action to improve communication institutions related to market activities.

The results of each of these studies point to a market exchange system where economic growth is directly inhibited by small scale, atomistic competition, or by factors directly related to atomistic competition. Conditions in the Puerto Rican economy suggest that a similar situation had existed there for number of years prior to 1950. Small-scale competition and a lack of organization in the markets had resulted in little use of available technologies due to a high degree of uncertainty and a prevailing pessimistic attitude toward "getting ahead" through individual initiative. The changes in the marketing system that occurred in Puerto Rico between 1950 and 1965 parallel an active commitment by the government to establish a truly "national market" to replace atomistic competition in food retailing.

Changes in Food Distribution

Making a "national market" may be thought of as the process of internal market development, characterized by a rising percentage of production being exchanged through commercial channels and showing continual improvements in terms of market coordination, marketing costs, product quality and variety, and market stability. Thus, the percentage of total consumption and investment that passes through commercial channels could be considered as one indicator of the development of a "national market." In this sense in Puerto Rico, there was more of national market in food in 1963 than there was in 1949. In 1949, only 44 percent of the food consumption passed through retail food stores, but by 1963 the figure had increased to 63 percent.

In Puerto Rico, the precursors of change were many. One of the most significant was the public and private commitment of a most powerful individual and first elected governor of Puerto Rico, Luis Muñoz-Marin. He committed himself, his party, and the entire commonwealth to a broad program of social reform. Not only was Muñoz-Marin verbally committed to social reforms, but he commissioned studies by experts, had those studies evaluated by the parties of interest, and then acted upon the experts' recommendations.

Teodoro Moscosco was selected for important tasks and became the implementer of Muñoz-Marin's ideas. Moscosco, as chief of the Puerto

Rico Industrial Development Company and then of Fomento, was concerned with achieving results. He was willing to go wherever necessary to find persons—even foreigners—who could help achieve results for "Operation Boot Strap."

One important effect of marketing improvements during this period was the reduction in gross margins both as a result of directed efforts at change and also private initiative. It was noted in earlier chapters that gross margins had apparently decreased since 1949 and that prices of basic commodities were lower in supermarkets in 1966 than in the smaller stores. Lower retail prices on basic commodities have seemingly meant greater purchases of those and other food products. There is considerable circumstantial evidence that during this time the demand for most goods, including food, was elastic.

Retail food stores introduced new products to the consumer. The unique commonwealth status permitted food retailers to by-pass local exclusive agents and wholesalers if it was advantageous and buy through companies on the U.S. mainland. Some of the larger retailers were buying three-fourths of their supplies directly from the United States in 1965.

Another important method for achieving marketing improvements was through contract buying arrangements between the large food retailing concerns and certain producer groups. In other cases special government action was required to help create a stable market environment and to encourage adoption of improved marketing practices. Partially as a result of better coordination and reduced fluctuations, production increased on certain high-value items such as eggs and milk.

It is evident, though, that the increasing development of the national market was not preordained. To a large degree new entrants were depended upon to bring about the necessary changes. Puerto Rican experience indicated, by and large, that it is difficult, if not impossible to provide assistance for existing firms. Most of the existing firms do not want assistance and will accept it only when their backs are against the wall. On the other hand, new entrants with certain sociological traits (See Chapter VII) seem to have a better chance of contributing to an increased national market. All of this is in agreement with the theories of Eric Hoffer, Everett Hagen, and E. G. Barnett. They tell us that change is difficult and risky and, therefore, the newcomer will likely bring about the change because he has so little to lose. Using the example of Puerto Rico, then, to stimulate improvements and to create more of a "national market," political leaders need courage to permit newcomers to rise to the surface, and there should be a planned program backed by the political leaders to foster greater marketing productivity.

Contribution to Economic Development

Changes in food distribution seemed to accelerate development by providing added employment in the retail food sector and by increasing incomes to farmers. Total employment in retail food distribution actually increased in Puerto Rico during the years that marketing improvements were being introduced. Also, there is evidence that the lowering of the risk for growing certain perishable and high-value products, such as milk and eggs, aided the economy through greater local production. The development of market stabilizing arrangements for these products helped farmers to meet the rapidly rising demand at lower prices through improvements in production and marketing performance. Fomento, the Puerto Rican government institution charged with bringing about industrial and commercial development, was responsible for setting up or encouraging the new, larger food retail operations. Fomento tried first to encourage established local businessmen to invest in new retail facilities on a matching funds basis. When this failed, Fomento became willing to help new entrants, such as the continental, Harold Toppel, of the newly established Pueblo stores. In addition, Fomento aided the Consumer Cooperative Federation with funds and technical assistance. Fomento also provided assistance to independent store operators by helping establish group buying and advertising.

While data suitable for making direct comparisons are scarce, there are strong indications that the resulting competitive environment in food retailing, especially in San Juan, produced slightly lower food prices, higher quality products, greater convenience, and a wider selection of products for the Puerto Rican consumer.

In summary, food marketing changes from 1950-1965 in Puerto Rico contributed to economic development by lowering food prices to consumers while providing improved products and services. This was accomplished simultaneously with an *increase* in the number of workers employed in food retailing. Thus food marketing provided more jobs and helped improve real consumer income. Both factors helped Puerto Rican consumers to improve their diets and produced additional discretionary income for the purchase of non-food items.

Correlates of the Innovative Process

The above contributions were not merely mechanistic changes. Innovations which resulted in more rapid economic development were introduced by individuals. Increasing the ability to predict the persons who bring about change will be of major assistance to those who direct and/or support programs of change.

The multivariate analysis of innovation provided the better explana-

tions of total variance. Among retailers, the explained variance was $\overline{R^2} = .875$ for one measure of the dependent variable innovativeness, and $\overline{R^2} = .722$ for the other. Attempts at explaining innovativeness among farmers were not as successful. It may be that farmers are less innovative.

In order to get a better picture of the types of firms and persons involved in food retailing, 87 variables were submitted to a factor analysis. A six-factor solution appeared to be best. The "ideal type" who brought about change can be identified.

We find the innovator is young, well educated, a foreigner, and one who utilizes the mass media to significant degree. In general, he is well informed; he knows of the government programs set up to help him and his business; and in addition, he has a knowledge of prices in other areas. He has traveled more than normal and believes that man can influence his environment. The harbinger of change is not the man with a store in the poorest section of town, but neither is he necessarily the member of the establishment which bankers sometime prefer.

An exploratory factor analysis was also performed utilizing 90 variables from the farmer survey. An eight-factor solution was chosen. While the results are somewhat difficult to interpret, the "ideal type" of innovative farmer is very similar to the innovative retailer described above. He is young, well educated, well informed, and more widely traveled than his less innovative counterpart. He has an optimistic attitude toward the future and feels that man's own actions can and should bring about beneficial changes. More than anything he seems to be a man who believes in and seeks after knowledge and who has confidence in his own ability to put that knowledge to work for his own and others' benefit.

Present methods of identification depend heavily upon the government employee, banker, or firm manager's ability to subjectively determine which individual possesses the strongest traits of innovation and entrepreneurial capacity. These results suggest that there are ways of objectively identifying those individuals with innovative and entrepreneurial capacities. Using the findings in Chapter VII and referring to other studies, it might be possible to construct a test of personality and information knowledge which could, at least, assist those with responsibilities for selecting individuals for loans, technical assistance, and for critical managerial posts in developing countries.

Development Policy Implications

In light of the foregoing discussion regarding the need for dynamic policy norms and the possibility that atomistic competition in some

cases may inhibit the development process, it is important now to look at the possible implications for economic policy goals and measures. This final section examines some general and specific policy goals for developing nations and suggests classes of market policy measures compatible with those goals.

A given society can utilize various combinations of political, social, and economic organization. This particular combination in use is determined historically by a wide range of factors, not the least of which are the values and beliefs held by the people of the society.

Within the framework of any political economy there are basic goals or objectives. Whether they are well defined and consistent or fragmentary and inconsistent, they compose the structure on which the political system depends. Regardless of the political and economic organization, if the perceived goals of the political group in power are not in harmony with the values and goals of the people, pressures will be brought to bear in an attempt (through revolution or orderly political pressures) to effect a change in leadership.

On the other hand, the feasibility of achieving a redirection of government policy goals is determined by the power (including political, economic, and military power) of those in control. Moreover, "the determination of people's values is not an especially well-developed science. . .," (Hathaway, 1963, p. 11) and because of conflicts and confusion, it is difficult even for sensitive and well intentioned political administrators to formulate acceptable policy goals and programs. This is especially true in a developing nation where values and beliefs are likely to be undergoing rapid change and where the people are impatient for tangible results. The characteristic political instability in Latin America attests to the fact that formulating acceptable policy measures to achieve those goals is a difficult undertaking in developing nations.

The following is a discussion of some of the general and specific goals relative to economic development and market coordination. In general, they are believed to be consistent with the current values and goals of the developing nations in Latin America.

General Goals

Probably the most universal goal among the nations of Latin America is to achieve a higher level of living. Evidence suggests that most of the people in Latin America hold values consistent with the goal for higher income. This goal is most frequently expressed by economic planners as a desire to achieve a specific percentage growth in gross national product. Occasionally the goal is expressed in terms of specific monetary increase in per capita income. Because of the rate of population growth, a per capita income goal is a more accurate indicator of

changes in levels of living than is GNP, but it does not provide an accurate measure of progress toward the basic goal of a higher level of living for the masses. When translated to the individual level in an economy, the goal is that each person should be provided with adequate income so that he is able each year to purchase and consume more economic goods than the year before.

The second general goal is closely related to the first, and, in fact, is implied in the restatement of that goal at the individual level. The objective may be stated as a desire to achieve an equitable distribution of the benefits of economic growth. The growth in per capita income should be achieved in such a way that the increase is equitably distributed among the people in the economy. To achieve a six percent increase in per capita income may be a worthy achievement in one sense, but if the increase is concentrated in the hands of a small percentage of the population, it will have little impact on the level of living among the majority. The term "equitable" was used in stating this goal. Perhaps a better term would be "acceptable," since within each country social and political realities will determine the type of distribution of benefits deemed acceptable. In one country equal distribution may be the immediate goal, while in another, considerable inequality may be temporarily tolerated.

The third general goal is concerned with equality of opportunity and individualism. The typical Latin American is anxious to protect his rights as an individual. And this individualism is accompanied by a desire for a fair opportunity to participate in the development process and to fully utilize his abilities for economic gain. A frequent, though not universal, corollary to this goal in Latin America is to maintain freedom of individual, political, social, or economic action to the extent that such actions are not detrimental to others in the society.

The final general goal is to maintain an acceptable level of economic stability. This goal appears to lack strong support from the basic values of the people. But there is a feeling that real incomes should not be permitted to decline for any reason. In Latin America most individuals are little concerned that economic fluctuation may arise from inflation, natural disaster, speculation, international disturbances, or other semi-controllable factors. However, they are ill-equipped to withstand such fluctuations whether they are chronic or temporary. Hence, the strength of the stability goal is frequently the result of a realization on the part of those in political power that their constituents often have difficulty in distinguishing between "temporary setbacks" and permanent economic trends. The market performance goals discussed below are based on the need to generate and "equitably" distribute more and more economic goods.

Market Performance Goals

There are two broad market performance goals which are consistent with the economic goals discussed above. They are concerned with (1) improving resource allocation and (2) stimulating technological progress. In the following section these goals are discussed individually, the relationship between improving resource allocation and stimulating technological progress to the necessity of market coordination is described, and finally, three specific market performance goals are suggested.

RESOURCE USE. Our received economic theory provides no clearly defined efficiency norm for a dynamic and less than perfect competitive economy. Dynamically modified* equilibrium analysis would suggest that an optimum allocation of resources can be achieved under perfect competition (and in certain cases under pure competition). At various times economists have pointed out, as did the Attorney General's Committee (Report of the Attorney General's National Committee to Study the Antitrust Laws, 1955, pp. 337-338) that the concepts of pure and perfect competition are tools of theoretical analysis. They are not intended to and do not constitute a description of reality. Moreover, the committee emphasized that "pure and perfect competition are wholly theoretical standards, in that they are not intended *as such* to be guides to public policy." (Ibid., p. 338) Nevertheless, we still find economists asserting that pure competition can and should be used as a norm for public policy. Witness the following statement by Richard Leftwich, in his popular intermediate theory text: ". . . economic models set up on the assumption of pure competition furnish us with a 'norm' or 'ideal' situation against which we can appraise the actual operation of the economic system." (Leftwich, 1963, p. 26) Such a preoccupation with pure or atomistic competition may be leading developing nations astray in their attempt to optimize resource allocation and economic growth.

Perhaps a more realistic goal for developing nations with respect to resource use would be to continually utilize existing resources in such a way as to raise productivity without concern for numbers of firms. The annual goal might be to achieve a specific increase in productivity in the economy. Sub-goals and policy measures would then be to achieve the over-all output objective. Admittedly, this kind of goal does not permit separation of the benefits of more efficient use of exist-

* This term is used to refer to static competitive theory modified to account for risk and uncertainty and to describe the sequence of events leading to equilibrium, but not including provision for endogenous determination of variables previously considered exogenous in equilibrium analysis.

ing resources from the benefits of technological innovation. But the two concepts should not be separated anyway; they are dynamically interrelated in the marketing system and should be handled accordingly in formulating policy goals. This does not mean that economic theory is useless. It simply means that more attention ought to be directed toward evaluating the actual performance of the system.

Specific market performance goals for resource use should be formulated around four different considerations. (1) Are production and marketing costs being reduced and, if so, how are the benefits distributed and used to further economic growth objectives? (2) Does the marketing system provide for effective transmission of incentives throughout in order to encourage and reward efficiency and innovativeness? (3) Does the marketing system function so as to transmit effective consumer demand to producers and facilitate production advancements? and (4) Does the marketing system provide for dynamic interaction between producers and consumers in order to create and fulfill demands for new and better products?

Marketing performance goals based on these considerations should lead, in a dynamic and developing economy, to a realistic evaluation of resource efficiency in production and marketing and should suggest specific government policies to cope with apparent deficiencies.

TECHNOLOGICAL PROGRESS. The second area of concern with respect to market performance goals is the stimulation of technological progress. The foregoing discussion pointed out that it is not desirable for policy purposes to separate the productivity effects of more efficient use of existing resources from technological innovations. The structure and conduct of the marketing system may have a significant impact on technological progressiveness among marketing firms as well as among producing and consuming units.

With respect to technological progressiveness as affected by the marketing system, there are two major factors to consider in formulating policy goals and programs. They are: (1) Does the prevailing market structure and conduct encourage or limit the introduction of technological innovation among producing, distributing, processing, or consuming units? and (2) Does the prevailing market structure and conduct provide for adequate (public and/or private) basic and applied research with satisfactory communication of the research findings?

MARKET COORDINATION. In judging the efficiency and progressiveness of any industry, it is important that the production-marketing system be evaluated realistically with respect to its effectiveness in coordinating production, distribution, and consumption. Proper communication through the marketing system between consumer wants

and producers, coupled with the potential power of the producer and marketing agents to alter consumer wants, is a critical and dynamic process which must be operating to encourage greater efficiency in production and distribution and at the same time improve the variety and quality of consumer goods. Such a process of dynamic interaction in vertical market channels appears to be a potential in most all rapidly developing economies.

Improvements in resource allocation and technological progressiveness seem to be important ingredients for all rapidly developing economies. These kinds of improvements must take place in individual firms. To illustrate the effect of market coordination on resource allocation and technological progressiveness, consider a situation where the vertical coordination process is improved to some minimum level whereby marketing risks and price fluctuations are significantly reduced at one particular point in the market channel—say at the producer level. The probable effects of such improved market stability may be some combination of lower costs and greater returns. Either of these results may provide a stimulus to the producer to make new investments in order to increase his scale of operation, adopt more efficient production techniques, or in other ways improve the efficiency of his production operation. As noted earlier, there are good indications that economies of scale associated with technological innovations are principal "movers" of economic development at the individual firm level. But technological innovation usually requires a capital accumulation and investment, which in turn is critically related to the process of market coordination that provides production incentives and determines the degree of market uncertainty at any point in the channel. Hence, performance improvements in any sector of an exchange economy are a function, at least to some extent, of the mostly intangible factor of *market coordination* in the product channel.

Operational Performance Goals. It is difficult to design a quantitative or even qualitative measure of "market coordination." However, the performance of the marketing system with respect to certain factors *is* affected by market coordination. The following specific performance goals afford some opportunity for evaluation of the effectiveness of market coordination as well as resource use and technological progressiveness.

1. Cost of production and marketing—usually influenced heavily by economies of scale and management improvements.
2. Progressiveness—i.e., willingness to adopt new improved production and marketing techniques.
3. Product variety and quality—a frequent and almost universally

beneficial correlate of a dynamic process of demand creation and improved coordination.

Economic development literature is becoming more and more concerned with the importance of technological change on the growth process. Nevertheless, to date there has been little effort to integrate technological progress with market structure and conduct.

Policy Measures

There are six classes of government programs which might be utilized if the marketing system as evaluated by the above criteria is not acceptable. Each of the following will be discussed briefly below: (1) property rights laws, (2) facilitative regulations, (3) assistance to marketing organization, (4) market control programs, (5) market planning and assistance arrangements, and (6) direct government investment.

In any exchange economy there must be some way to provide for orderly protection of the rights of individuals of business units with regard to property ownership. The problem is particularly crucial in an economy based on bargained exchange. Procedures must be established for the orderly flow of products and property rights as goods change hands. Marketing performance may depend on the adequacy of government rules and regulations establishing procedures for protecting property rights and providing proper judical proceedings for settling exchange disputes. These kinds of laws and regulations are quite basic and are usually formulated fairly early in the development process. However, they require frequent scrutiny to assure that they serve the needs of a changing economy. Moreover, even well-conceived and fully justified property rights and market control laws, when poorly administered, can produce harmful rather than the beneficial effects expected. In some cases, it may be better to have no legislation at all than to have basically good rules ineffectively administered.

Often, government marketing policy in private enterprise economies is concerned primarily with providing services and regulations that will facilitate competition and improve exchange efficiency. Such policies may be extremely beneficial in an over-all effort to improve marketing performance. Specific examples of helpful regulations include collection and dissemination of market information, provision for uniform grades, weights, and standards, fair trade regulations, anti-trust legislation, credit assistance, and research and assistance in the use of new techniques of production and distribution. In Puerto Rico, these and similar methods have been utilized in a highly successful effort to improve marketing efficiency while facilitating competition.

Most developed nations have found that certain kinds of economic institutions are a valuable aid in the development process. It may be necessary for government marketing policy to include provisions for facilitating and encouraging certain types of economic organizations and associations. Two of the most common are corporate and cooperative associations. Others might include trade associations, professional groups, research consortiums, and other organizational forms which in a given situation might contribute to improved over-all marketing performance and economic growth.

The fourth type of governmental market policy program is market control programs. These are government policies planned specifically to alter the market coordination process. They are most frequently used in cases where the market for a given product is chronically unstable or out of balance with the rest of the industry or economy. They represent a more strenuous effort to improve production and marketing efficiency through manipulation and assistance in the market coordination process. Specific examples of market control programs are price supports, marketing boards, marketing agreements and orders, and direct government allocation programs.

The first four types of marketing policy measures encompass most of the marketing programs utilized in the United States and other "private enterprise" economies trying to bring about better performance. The last two policy measures suggest moving toward stronger government action.

There appear to be times when, as a result of extreme uncertainty, small scale business, low technical knowledge, or inertia, individual businessmen are slow to move ahead with production and marketing schemes necessary for economic development. In such cases it may be possible to devise government programs which can provide encouragement and assistance to interested parties. The government of Puerto Rico has utilized this technique for encouraging local as well as foreign firms to invest in certain productive enterprises. A special government agency (Fomento) is charged with the responsibility of interesting and encouraging investors, making preliminary feasibility studies, obtaining loans, providing buildings, and assisting in various other ways the operation of the enterprise. A second approach also being tried in Puerto Rico is regional agricultural planning. The island is divided into five regions. In each a regional director is responsible for coordinating all agricultural programs. In each region intensive studies of agricultural production and marketing have been carried out. Using that knowledge, the regional director is responsible for preparing specific plans for improving resource use through assistance to farmers in re-allocating resources and coordinating agricultural markets. Such programs afford

the opportunity for the government to evaluate needs on a broad scale and concentrate efforts toward encouraging private enterprise to provide those needs.

Finally, a method for achieving marketing performance goals, which is one step beyond the method just discussed, would be for the government to directly finance and manage production and distribution units. There may be certain cases where private enterprise will not provide effective development even with encouragement and assistance. At other times it is necessary for the initial firm that is "breaking the ice" in an industry to lose money in the early years of operation. Food storage and processing facilities are examples of marketing investments which may require direct government participation. Experience seems to suggest, however, that in a bargained exchange economy, government agencies should apply this alternative with care. Publically-owned firms frequently get bogged down in inefficient management as did the Puerto Rico Industrial Development Company.

A Paradigm

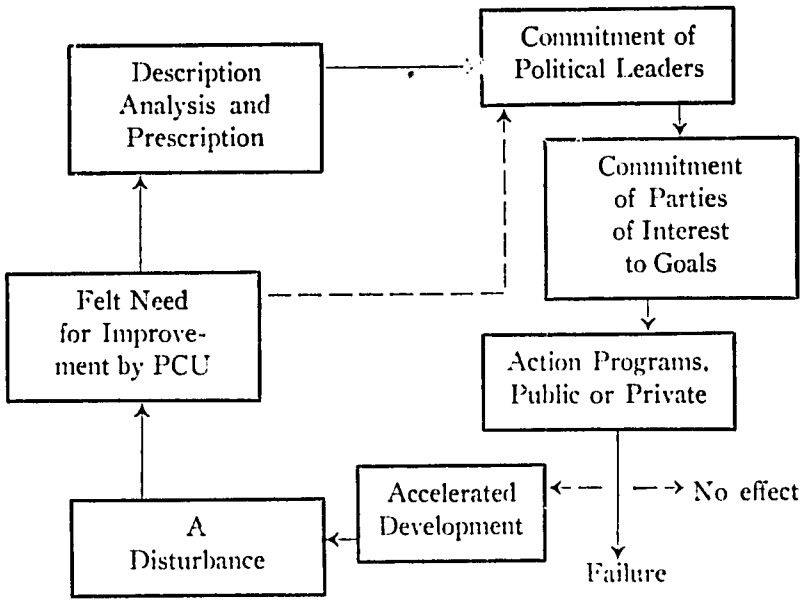
The following diagram is one way of describing the changes that took place in Puerto Rican food marketing over the last 15 years. The rectangles are events which appear to be significant in bringing about changes that could affect rates of development. Each person and each institution within which that person operates in a given social system is a production-consumption unit (PCU). That is, he has the potential to produce and the need to consume in order to survive. Persons and institutions relate to other persons and institutions through exchange. The arrows in the paradigm represent exchange. The exchange may or may not have a monetary value assigned to it; but, in the absence of coercion and if the relationship is to continue, in the long run both parties must perceive a gain from the exchange.

Economic development necessarily implies increased exchange due to increased specialization (i.e., interdependence).

Increased exchange will not come about rapidly without some factor to disturb the semi-closed system. The PCU changes internally; then he takes action and makes happen one of the events specified in the diagram. To the extent that the PCU can bring about a successful exchange relationship with other PCUs, the other events may take place. Either formal or informal description analysis and prescription is necessary.

The event "commitment of political leaders" is especially critical. If the politicians oppose the change, it will probably not come about. On the other hand, the event "commitment of political leaders" by itself is not a sufficient condition. It is desirable to have the commit-

A Paradigm of Events and Exchanges in Socio-Economic Changes



⟷ = exchange which is made up of messages and goods and services. The arrow head indicates the receptor of the message, goods, or service.

ment of parties of interest, so that they will not completely block the suggested changes. If the parties of interest are in a position which prevents them from blocking suggested changes, then action programs can be initiated.

At the time action programs are initiated, it cannot be known for certain what the outcomes will be. The best-planned efforts may not turn out as desired, but the action program is more likely to be successful if the PCU (government, corporation, or individual) has pragmatic individuals who: (1) are concerned with results which, in this case, are perhaps lower prices and certainly a higher capital output to input rate; (2) are open to new solutions; (3) are committed to the goals of a better standard of living; and (4) have the ability to identify the individual contributors to change (i.e., the innovator).

A Concluding Note

A government that was organized to solve problems and the blessing of the top political leaders were basic factors in the changing food marketing system in Puerto Rico.* The Puerto Rican government of the fifties had a powerful charismatic leader who essentially had three operating ministries: (1) planning—to make sure programs were moving toward agreed-upon goals on time and at reasonable costs; (2) Fomento—the semi-autonomous agency charged with the horrendous job of assisting industrialists and commercial interests in setting up a sufficient number of operations to increase income of the Puerto Rican citizens and also hold down unemployment;** (3) the Department of the Treasury—charged with getting sufficient revenues for the government to operate. Although there were other ministries, these three held the power.

In reforming the food distribution sector, Puerto Rican officials made an intelligent choice in staying close to the consumer. They depended upon the retailers' knowing what consumers wanted and being able to get these goods from producers and processors.

Basically, the officials were concerned with a common set of goals: keeping food prices from rising too rapidly; and improving the retail stores. They were open minded and willing to try a number of avenues. They were not married to any ideology but instead looked to the pragmatic results of better levels of living for the masses.

The Puerto Rican experience shows that the fear of unemployment as a result of commercial reforms can be (and probably most always is) a straw man. In a free and open society, reforms do not come about overnight. We live in a dynamic world, and any new institution brings about reactions. As more efficient operators came into the scene in Puerto Rico, total employment in retail food distribution actually increased. There was apparently no time when employment decreased.

It is a known fact that Puerto Rico is one of the few areas of the world that has had a thorough-going reform in distribution with almost no political opposition. One of the reasons for this was the manner in which the government of Puerto Rico approached the subject. First, the top political leader indicated his concern with what he and others perceived to be a problem (in this case, high food prices). Competent technicians were asked to make a detailed study of the situation and publicly make available their results. After the study was made, the

* The United States government is organized differently. The check and balance system sets up ministries which represent various intrest groups (e.g., Labor, Commerce, Agriculture).

** One must also remember the unlimited migration to the U.S. mainland.

top political leader appointed a commission of interested parties to study the technicans' recommendations. Finally, the government began a system of planned reform, acting upon the commission's recommendations.

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