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An Economic Evaluation of the Product Sugar With Special Emphasis on the Abnormal Sugar Market of 1963-1964

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AN ECONOMIC EVALUATION OF THE PRODUCT SUGAR WITH SPECIAL EMPHASIS ON THE ABNORMAL SUGAR MARKET OF 1963-1964

by

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

An Economic Evaluation of the Product Sugar

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by

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The product sugar is studied in detail with special emphasis on supply and demand factors, in an attempt to better understand the abnormal sugar market of 1963-1964.

The unusual market fluctuations of that period appear to have been initiated by a statistical imbalance in world supply and demand of sugar.

The extent of price fluctuations in the United States during 1963-1964 were accentuated by the inability of current sugar legislation to shield the U. S. market from the world market, and by the openly aggressive purchasing policies followed by the U. S. Department of Agriculture which further aggrivated an already thin and inflated world sugar market.

There is also evidence that excessive market activity on the New York Coffee and Sugar Exchange by the nonprofessional group of buyers contributed additional instability to the sugar market, along with the scare buying and hoarding which were common in the U. S. especially during the critical days of 1963.

(134 pages)

CHAPTER I

SUGAR

$C_{12}H_{22}O_{11}$ is the chemical designation given to the white, powdery, carbohydrate we know as sugar. Scientists actually recognize one hundred and forty different sugars (43, p. 20). These are divided into two main groups: the monosaccharides and the disaccharides. The two most important of several sugars included in the first group are glucose (dextrose) found in corn, and levulose (fructose), which is found in certain fruits. Sucrose, the sugar with which we are most familiar, falls into the second category, which also includes such sugars as maltose (malt sugar) and lactose (milk sugar).

The sugar of commerce, or sucrose, can be obtained from several sources. It can be taken from sugar beets, sugar cane, palm trees, maple trees, sorghum, watermelons, grapes, and many other plants. The sugar obtained is identical, no matter what the source (52, p. 214).

The Importance of Sugar

According to Dr. William F. Robbins, former director of the New York Botanical Gardens and professor at Columbia University:

> Sugar is the foundation of life, the substance upon which, in the last analysis, our existence and the development of modern civilization rest. . . . without its presence in the body, the heart would cease to beat, the blood would fail to flow, life itself would stop. (52, p. 12)

The importance of sugar is more easily recognized and understood when we know that sugar is the first substance manufactured by all green-leafed plants, which in turn support all human and animal life (16, p. 2). This means that when we eat a steak or a piece of chicken or even drink a glass of milk we are consuming food which was at one time sugar. In fact, all of the energy which the human body burns as fuel was originally taken from the sun and formed into sugar by green-leafed plants.

> As a food, sugar requires no eulogies. Mankind has survived because it and several other nutrients are so widely dispersed and so generally available in the food we eat . . . It would be difficult to imagine an existence without sugar, both as a source of energy and as a sweetening agent. (42, p. 31).

Sugar is not only an intensely valuable energy yielding carbohydrate, it is also of prime importance as a sweetening agent in the preparation of other nutritious foods. Many of these foods would not be consumed except for the palatability afforded by the inclusion of sugar (52, p. 9).

Sucrose is also one of the easiest foods by the body to utilize and absorb. Sugar taken by mouth is reflected in higher blood sugar in one to four minutes (42, p. 11). Athletes have been aware of the value of sugar as a rapid energy food for many centuries, and it is very common to see them eating candy or other sugar products just prior to an athletic event.

As a source of calories, sugar is without equal in its usability by the body; and it is the least expensive of all high-calorie or high-energy foods.

Sucrose is used extensively in the feeding of infants and in intravenous feeding. In both cases it is a very important source of life-giving energy.

The sugar beets and sugar cane which are grown to produce sucrose are extremely important agricultural products. Beets or cane are grown in

almost half of the states in this country. In 1966-67 there were 22,316 farms involved in the production of sugar-yielding crops within the continental United States and many additional farms and plantations were growing sugar cane in Hawaii and Puerto Rico (64, p. 29; 65, p. 29).

The importance of sugar to the farm economy is easily discernible when one examines the number of farms growing sugar-yielding crops and the returns paid on their production. In 1966 gross receipts to domestic producers of sugar beets and sugar cane were more than 432 million dollars (64; 65), a very healthy contribution to farm income and the purchasing power of the agricultural community.

Sugar is much more than an agricultural product. In areas where cane and beets are processed or refined, local communities are called on to provide transportation for sugar crops and processed sugar, materials and supplies for manufacturing, and, of course, support services for not only the plants themselves but also for the thousands of employees that will be needed to help make cane or sugar beets into refined sucrose.

The sugar refining industry alone employs more than 17,500 persons with an annual payroll of over 100 million dollars; uses over 60 million dollars worth of chemicals, fuels, and supplies; and pays out more than 120 million dollars in taxes (55, p. 15).

Sugar, once it has been refined, passes to the consumers in several ways. It can be handled by jobbers and brokers on its way to the grocers' shelf, or it may flow to the industrial section of the economy where it becomes an essential raw material.

As a raw material to the industrial market, sugar is added in various proportions to a great variety of products, many of which depend on their sugar content for public acceptance. The sugar in a soft drink, for example, will account for 7 to 20 per cent of the total volume and nearly

100 per cent of the solid content. In some confections the percentage of sugar may run as high as 95 per cent.

Sugar in its role as a pure organic chemical is utilized in many non-food uses. Probably no other single material is used so extensively in such a variety of important products as is sucrose.

The importance of sugar to the entire population of this country is difficult to measure because of its thousands of uses. We do know, however, that life, as we know it, would not be possible without sugar.

The History of Sugar

The history of sugar runs hand in hand with the history of civilization. It is believed that sugar cane was first discovered in India; and, although no date is assigned to its discovery, it is first mentioned in the Institutes of Manu, which are Indian writings which predate the Christian Era by some 1,000 years (7 , p. 606).

From India the "sweet grass," or sugar cane, found its way into China; and as early as the eighth century B. C. Chinese writers were well aware of its existence. In 200 B. C. the Kingdom of Fundan paid its tribute to China in cane (38, p. 119), and this is the first recorded use of sugar as an item of barter. Since the transaction took place in cane itself, however, we may assume that a sugar extractive process was not yet developed in China.

Along the Nile, the ancient Egyptians with their advanced knowledge of chemistry were probably the first people to develop a true refining process, although it is believed that crude refined sugar made its first appearance in India around 400 B. C. (56, p. 17). Egypt was for many years the most famous source of this wonderful sweet powder.

The Crusaders brought stories about cane and cane sugar back to Europe and helped to stimulate a flourishing sugar trade between Europe and the Mediterranean countries which lasted for many years. Venice became the sugar capital of the known world and because of their advanced refining knowledge, the Venetians maintained a monopoly on sugar trade during most of the fourteenth and fifteenth centuries (49, p. 5).

During this period of history, sugar was a luxury item enjoyed by only the extremely wealthy families of medieval Europe. Its value as a food and sweetener was increased by the belief that sucrose also held mystic healing powers (73, p. 129).

When the Turks captured Constantinople in 1453 and began extracting heavy tribute from all Mediterranean-bound caravans, the sugar trade began to die out, and new production areas outside the Turkish blocade were developed to satisfy the growing sugar demand of wealthy Europeans (50, p. 4).

Cane in the New World

The story of sugar cane in the new world begins with the second voyage of Columbus in 1493. Cuttings of cane were carried to Hispaniola (now the Dominican Republic) and Haiti, where the first successful cultivation was finally initiated in 1506. Sugar was successfully refined in 1509 and the sugar industry was firmly established in the new world (49, p. 6). The Spaniards' interest in developing a sugar industry was apparent from their very earliest activities.

Cane production in Mexico dates back to 1520. Under the direction of the Spanish conqueror, Cortez, the first mainland cane operation in North America was begun. In 1535 Cortez personally supervised the building of the first cane factory on the North American continent.

Sugar Comes to the United States

It was not until the mid-1700's that any successful attempt at producing sugar was made in what is now the United States. The Jesuits, who had taken cane cuttings into Argentina in 1670, successfully introduced cane cultivation in Louisiana in 1751. Little progress in sugar extraction was made, however, until several years later (50, p. 5).

Some sugar was exported to France as early as 1765 (73, p. 138) but it was not until 1791 that an economically successful sugar mill was finally established in Louisiana by Antoine Mendez and a crew trained in the flourishing Carribean sugar industry. Eutienne de Bore followed Mendez' example and in 1794, he developed a stable and profitable sugar plantation. Other planters, encouraged by de Bore's success, planted the sugar-bearing crop and the cane industry in the United States was born (49, p. 7-8).

Florida also has an interesting sugar history. In a letter, Pedro Mendervez, the first Spanish governor of Florida, was ordered by the Spanish government to initiate and develop sugar production in the new colony. He tried unsuccessfully in 1562 to carry out that order at Saint Augustine, and later made attempts in other parts of Florida. He was not successful, however, and the Florida cane industry was abandoned until the middle of the Eighteenth Century.

Andrew Turnbull, an Englishman, was the first successful sugar farmer in Florida. His small operation was in existence from 1765 until 1783, when the English returned Florida to the Spanish. Cane production in that state, however, continued to be sporadic until the recent development of a strong sugar cane industry in the Everglades (50, p. 5-6).

Cane production for the milling of sugar was initiated in eight other states during early American history. Climatic problems, poor yields, better alternative crops, and a lack of sugar-producing knowledge caused each of the various attempts to fail. Only Florida and Louisiana produce cane sugar on the mainland today, although several other states grow sugar cane for the production of syrup (50, p. 6).

Beet Sugar

Europe depended on the tropical cane-growing areas of the world for her entire supply of sugar until the Nineteenth Century. Piracy, recurring wars, and outrageous sugar prices caused many Europeans to begin searching for a more convenient and steady source of sucrose. In 1747, a German chemist named Andreas Marggrof discovered that the sugar in a white beet (Beta Vulgaris) was exactly the same as the sugar extracted from cane (41, p 11).

This marvelous discovery was considered only a laboratory success, however, until Franz Karl Achard, one of Marggrof's students demonstrated a practical method for extracting the sugar (75, p. 4). Production of sugar in the temperate countries of the world was now possible and several European countries made immediate attempts to use this new-found knowledge.

Napoleon, whose country was being blockaded by the British during the early 1800's, was keenly aware of the sugar shortage in France. He ordered thousands of acres planted in sugar beets and appropriated one million francs for sugar beet culture and the establishment of six training schools for beet farmers (41, p. 11).

In Prussia, King Fredric Wilhelm III took special interest in the sugar beet and the first real beet factory was built under his guidance in

Cuneru, Silesia in 1803 (52, p. 88). Shortly thereafter, 40 sugar factories were constructed in France to produce beet sugar; and they actually did produce nearly three million pounds of sugar each year for a short time (41, p. 11).

Europe's infant sugar beet industry, which had grown up a sheltered child of wars and sugar shortages, was not strong enough to survive the flood of inexpensive cane sugar which followed Napolean's defeat at Waterloo. In a short time, all but one of France's 40 beet factories closed their doors (73, p. 148).

The sugar beet was not forgotten, however. Ingenious men worked to find bigger and sweeter beets and better ways to tap their sugar content. Soon beet fields were replanted and by the mid-1800's nearly all of Europe was once again producing beet sugar.

Today, almost all agricultural countries in the temperate zones of the world grow sugar beets and extract sugar from them; and as a result many of these countries are no longer totally dependent on the tropics for their sugar supply.

Sugar Beets in the United States

The formal initiation of the sugar beet industry to the United States was made by a Philadelphia company headed by James Ronaldson. He succeeded in producing his first crop in 1830 and even manufactured some crude sugar at that time, but the operation was doomed because of a lack of understanding of the technology of the extraction process (38, p. 126). Other pioneers soon followed Ronaldson's example and further attempts were made to establish a sugar beet industry in the U. S. in the mid-1800's.

David Child, a student of the European beet industry, made the second attempt when he opened a small plant in Northampton, Massachusetts, in 1838.

This effort was also due to fail because of a lack of proper technique and knowledge, but he did make progress and his work came close to being successful (41, p. 88).

The Church of Jesus Christ of Latter-day Saints, centered in Salt Lake City, Utah, made the first attempt to produce sugar in the western United States. John Taylor was appointed by the Church to establish beet production. In turn, he sent two men to study the European beet industry and to purchase sugar machinery to be sent from France. The machines were brought to Utah under great hardship, but the Mormons were unable to produce sugar and the operation was abandoned in 1855 (Great Basin Kingdom).

During the next 25 years attempts to produce sugar were made in San Francisco, California (1856), Chatsworth, Illinois (1863), Fond-du-Lac, Wisconsin (1866), and Hartford, Maryland (1879). Several states passed laws in the late 1800's giving the beet industry a tax-free status to encourage its development; still no one could find the right combination to get the sugar beet industry established and operating (41, p. 92-94).

Finally, in 1870, E. H. Dyer, who is called the father of the U. S. beet industry, organized a company and built a factory at Alvarado, California. This plant operated successfully, and some beet sugar was produced (38, p. 151). Financial difficulties forced the plant to close its doors after several years, but Dyer reorganized and built a new plant in 1879 near the old site; this second sugar factory is still in operation today.

Dyer's success encouraged new efforts in the western part of the country. Claud Spreckles established a successful plant at Watsonville, California, in 1888, and the Oxnard brothers built a chain of factories on both sides of the Rockies in the 1890's. Businessmen in Utah, Idaho,

Colorado, and Michigan poured more and more money into factories and equipment. The sugar boom in the West was now well underway (41, p. 94-97).

Thirty new factories were built between 1890 and 1900; fifty more were constructed before 1910. Poor business, drought, plant diseases, and low sugar prices forced a number of the infant beet sugar factories out of business; but many are still in operation (41, p. 91).

The beet industry has grown and prospered in this country since its first fragile successes in the late 1800's. Today, nearly half of the states in the United States grow sugar beets, and more than sixty sugar factories are operating to handle the expanded crops that are being produced.

The Production of Cane Sugar

Sugar cane is a tall grass-like perennial which grows best in damp tropical climates. It is particularly well adapted to the growing conditions in many of the areas located in the Mediterranean, the Pacific, and the Carribean. The cane plant actually creates sugar through the process of photosynthesis by utilizing the energy of the sun and the elements in water and air.

Cane normally grows from 8 to 20 feet in height and usually requires from 12 to 24 months to mature; although in some areas, notably Hawaii, it requires a longer maturing period. Fully developed cane will contain nearly 90 per cent juice. The sugar is entirely contained within the juice and will amount to from 12 to 15 per cent of the total weight of the cane (56, p. 11).

Short sections of freshly cut cane are used to seed new sugar cane fields. The first crop from the cuttings is called plant cane, and additional crops from the same root systems are called ratoons. There

may be as many as eight such crops in Cuba (50, p. 23).

Growing cane may require as much as 2,000 pounds of water to produce a single pound of sugar (5, p. 3). Proper weed and pest control must also be maintained to insure a maximum crop.

As the cane ripens, it will normally be set on fire just prior to the harvest. This removes many of the leaves and tops which do not contain sugar. To harvest the cane, the stalks are cut close to the ground, the remaining leaves are removed, and the cane is loaded on carriers and transported to nearby sugar mills. Most of the United States cane crop is harvested by machine.

As the cane stalks reach the sugar mill they are washed with powerful jets of water to remove the trash and debris gathered during the harvest. They are then cut into small sections and fed into high pressure rollers which extract the juice from the cane.

The juice is collected in tanks where it is heated and mixed with chemicals which combine with impurities forming foam and sediment which are removed. The purified juice is placed in evaporators which remove excess moisture as steam, leaving a thick amber colored syrup called massecuite which is about 50 per cent sugar.

The massecuite is then piped to vacuum pans where crystallization takes place and the syrup becomes a mixture of sugar crystals and molasses. These two segments are separated in centrifuges which throw out the molasses and leave the sugar crystals behind.

This raw sugar is light brown in color and is approximately 97 per cent refined. The by-products of the milling operation are molasses which is used in the feeding of cattle and the manufacture of industrial alcohol and Bagasse or cane fiber, which may be used as a fuel or in the making of wallboard and plastic. There is also some filter residue which is used

as plant food.

Some sugar mills may be equipped to process sugar to consumable forms, a good example is turbanado sugar which is used industrially or for local consumption; but most mills will send their raw sugar to be refined in the large refining centers in this country which are located near the consumer markets and ocean waterways. Most of the sugar is moved by specially equipped ocean transports and today most of it is shipped in bulk.

The final refining process is necessary to remove the remaining molasses and impurities from the raw sugar, thus producing the pure white sucrose with which we are familiar. As the raw sugar enters the refining process it is mixed with syrup to loosen the molasses and becomes a thick solution called magma. The magma is washed in huge centrifuges which remove most of the molasses and other impurities.

The sugar crystals, which are now nearly 99 per cent pure, are melted in hot water so that the remaining color and impurities may be filtered out. Fabric and bone char filters remove nearly all of the remaining non-sugars.

The colorless liquid from this operation flows into large evaporators which remove excess moisture. The thickened syrup is then boiled in vacuum pans until properly crystallized. All traces of color and molasses are removed in the final washing which takes place in the centrifuges.

The pure white crystals of sucrose are dried and readied for packaging into consumer-size packages or further processing into cubes or sugar tablets. Liquid sugar is created by a similar process, but the final drying and crystallization are followed by remelting the sugar and combining it with liquid carrying agent.

Some types of soft sugars may also be produced by adding the desired

amount of refined cane syrup to achieve proper taste and texture. Super refined and powdered sugars must also receive further processing (9, p. 1-6; 50, p. 22-27; 49, p. 10-21).

The Production of Beet Sugar

Sugar beets are a special type of white or yellow garden beet which grow best in the temperate areas of the world. The average beet weighs one and one-half pounds at harvest time, and it stores as much as 14 teaspoons full of sugar in its large root which usually grows to about 14 inches in length. Sugar beets are a very adaptable crop; they are successfully cultivated from the high mountain valleys of Colorado, nearly 8,000 feet above sea level, to the Imperial Valley of California, which is below the level of the sea (10, p. 165).

Sugar beets actually manufacture sucrose by utilizing water, air, and sunshine through the process of photosynthesis. The sugar produced in this operation is stored in the pulpy root which will contain from 12 to 16 per cent sugar at harvest time.

Beet seeds are normally planted in the spring to accommodate a fall harvest although in the warm Imperial Valley of California the process is reversed. To insure a good beet crop, the rows of sugar beets must be properly thinned, weeded, and irrigated. Most of this work, which was once done by hand, is now accomplished by specialized machinery.

As the crop matures the beets must be removed from the ground and the tops must be cut off. The beets themselves are then loaded into trucks to be hauled to nearby factories for processing. The sugar beet harvest is now virtually 100 per cent mechanized in the United States (28, p. 18).

As the beets arrive at the factory they are thoroughly washed and cut into thin slices known as cossettes, which resemble shoestring potatoes.

The juice is extracted from the cossettes in a soaking process known as diffusion. The soaking removes all of the sugar through osmosis, and the cossettes, minus their sugar content, become beet pulp which will go to driers for later use as cattle feed. The juice extracted from the beets contains from 10 to 15 per cent sugar and must follow processes similar to those used in the refining of cane juice.

The raw juice is first fed into tanks called carbonators, where the fluid is mixed with lime juice and carbon dioxide. The impurities precipitate out of this solution and are removed. The liquid thus obtained is called thin juice. The thin juice is evaporated until it is from 50 to 65 per cent sugar, when it becomes evaporator thick juice. This solution is further filtered and refined through both fabric and bone char filters until it is very clear and pure and is ready to be crystallized.

Crystallization takes place in vacuum pans; the end product of this process is called white fillmass, which is a mixture of crystallized sugar and molasses. The white fillmass is placed in centrifuges where separation of the molasses takes place. The sugar crystals are washed with hot water at this time. The runoff of this washing operation contains some sugar which may be partially recovered through additional processing. The molasses becomes a by-product of the refining operation.

The pure sugar crystals are dried in large rollers containing very hot air before they are completely refined. The sucrose which emerges from this operation is ready for consumer packaging or further refining, whichever is desired.

Liquid sugar will be melted once more and also refiltered before it is shipped to consumers in tank trucks. Bulk sugar will be handled directly out of the sugar warehouses and most of the remainder will be

processed for direct consumption. Beet sugar may be super-refined or powdered, or even made into brown sugar to satisfy the sugar demand of the public, and, of course, some will be further processed into cubes and tablets.

The refining of sugar beets provides some valuable by-products. Beet tops and beet pulp make excellent cattle feed, while the molasses may also be used a livestock feed or in the manufacture of industrial alcohol. Monosodium glutamate, a popular taste enhancer for foods, is produced from the residue of one of the secondary refining processes, while other chemicals collected during filtration may be used as plant food for the conditioning of soil (24; 10, p. 141-142; 50, p. 27-33; 41, p. 15-43).

CHAPTER II

THE SUPPLY OF SUGAR FOR THE UNITED STATES

The supply of sugar referred to in this study includes all of the centrifical sugar, both beet and cane, produced within the United States or imported into this country for consumption purposes.

Although large quantities of sugar are produced in the United States, we do not produce enough to supply the more than 10 million tons which are demanded by consumers in this country each year. A little over a third of the sugar consumed in this country is produced in foreign countries.

The sugar we use comes from many parts of the world. When you sweetened your ceral or your coffee this morning you may have used sucrose produced in a nearby sugar cane or beet field or the sugar may just as easily have come from Ireland, South Africa, India, or Australia. Nearly 40 foreign countries delivered sugar to the United States in 1967 (64, p. 19).

Sixty per cent of the sugar we use is produced under the American Flag; the other 40 per cent must be imported. The largest single contribution to U. S. sugar supplies comes from the sugar beet growers in this country, who provide more than one-fourth of our normal requirements.

The Philippine Islands is the largest single foreign supplier in the market, providing nearly one-tenth of our sucrose needs, while Hawaii, the largest producer on a state level, provides more than 10 per cent of U. S. sugar supplies.

Thirty foreign countries held sugar quotas during 1967, which entitled them to export sugar to the United States to help fill this nation's sugar

requirements. Sugar supplies for today's market come from sources radically different, in many cases, than those employed 10 years ago. Cuba was once this country's chief supplier and personal warehouse. Before Castro's takeover, the area supplied the U. S. with approximately 3 million tons of sugar or about one-third of our normal requirement (25, p. 6).

Reserve supplies were always set aside out of Cuba's excess production to allow for immediate quota increases and shipments if U. S. sugar consumption ran ahead of schedule, or if other supply areas failed to meet their quotas. With an unfriendly government in power in Cuba, these large stocks of sugar are no longer available to the U. S., and many other suppliers have necessarily been utilized to make up the difference.

With so many small or piecemeal quotas in effect "our source of supply is sufficiently scattered to insure in the aggregate, a dependable source of supply." (9, p. 17) These small quotas do offer problems in administration and in the added inconvenience of dealing with some suppliers who may only ship a few cargos per year to fill their quota allocation. The timing of such shipments might also cause problems if consumption runs well ahead or behind these fragmented shipments on a quarterly or month-to-month basis.

The supply of sugar available to the U. S. is affected by numerous factors. Some of the variables that should be examined, in their relationship to the quantity of sugar available, are price, the availability and price of resources, capacity, weather, technology, mechanization, and legislation.

Each of these factors must be weighed in its relationship to the amount of sugar which will be generated by the domestic cane and beet sugar industries and also relative to the available supply of raw sugar which

will be imported and refined within the United States. This entire discussion must necessarily be tempered by the limitations and restriction of sugar legislation.

Price

When sugar prices rise sharply, as they did in 1963, they tend to influence the production of sugar in several ways. Initially, the current crop will be harvested for maximum yield. This will involve intensive cultivation and careful harvesting of beets or cane, and even marginal crops that might otherwise have been left in the field.[1]

The crop for the following year will also be strongly influenced. Planting will be heavy as new areas are brought into cultivation and marginal producers are once again put into operation to take advantage of the high profit margin. It was noted in 1964 that the high prices that had prevailed since 1963 had proved to be "good fertilizer." (13, p. 4). Many countries expanded their sugar production or initiated expansion programs which eventually helped to alleviate the expected shortage of sugar.

There are areas which implement expansion during periods of high prices that are by no means marginal. The production of sugar in some of these areas has been neglected because of their political climate, and it will only be developed when high potential profits serve to attract the amount of venture capital necessary to establish sugar production.

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[1]If sugar prices in the world market are very low, it may not be profitable to harvest cane for which there is no predetermined market, so it will sometimes be left standing to be harvested at a later time, with the hope that the price of sugar will improve in the meantime.

As the price of sugar drops, opposing conditions will prevail. Current crops will be less thoroughly cultivated. Marginal cane or beet fields will not be harvested and some good cane might be left standing for harvest in the following year. Inefficient producers of sugar or sugar yielding crops will be forced out of business and planned expansion will probably be delayed in most areas.

The price mechanism is not fully effective in the United States because sugar prices are not allowed to fluctuate freely. Although the price of sugar is not fixed or decreed, it is, as a matter of legislative policy, manipulated to conform to a certain target price.[2]

Through the artificial control of sugar prices, the sugar act has successfully insulated sugar producers in this country from the price conditions which exist in the world market, except for the highly unusual periods of extreme price abnormality such as the one which existed in 1963 and 1964. In normal times. U. S. sugar prices operate well above the world price and sugar is produced, processed, and where necessary, shipped to the United States in response to the U. S. price rather than the price which exists in the world market.

Thus insulated from the free and fluctuating price in the world market, resources are allocated on the basis of the controlled and normally inflated price of sugar in the United States.

Sugar prices can still have an impact on sugar production, however, because farmers must still decide whether to plant sugar-bearing crops and those crops must be milled and processed. All of these functions will be fulfilled only if sugar prices are high enough to offer reasonable returns. (Under current sugar legislation, this is almost a foregone

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[2]See page 68.

conclusion.)

Rising sugar prices stimulate sugar producers to increase sugar production, but the extent of that increase will be controlled by the sugar act with the application of acreage restrictions and marketing allotments. Sugar producers, therefore, may not be free to respond fully to controlled sugar prices unless such restrictions are relaxed or withdrawn.[3]

The sugar industry is free to react negatively to sugar prices by deciding not to produce sugar if the price seems to be low or if other crops are more attractive. Such a reaction could penalize the farmer or processor in future years, however, by reducing his acreage and marketing allotments which are granted with heavy consideration to historical production and sales records.

In essence, not only is the price of sugar controlled in the United States, but reaction to changes in that price are also subject to regulation through the quota system, and the manipulation of sugar supplies.

Availability and Price of Resources

The production of refined sugar requires the investment and utilization of large quantities of land, labor, and capital. Most of the productive resources used in producing sugar have numerous alternative uses, while others like the cane lands of the Florida Everglades, are quite specialized in their application.

The flow of resources in and out of the sugar industry is limited by the high fixed costs and low marginal costs which exist in the sugar

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[3]Restrictions on both cane and beet growers have been dropped frequently in the 1960's. Sugar cane was free in 1960, 1961, and 1962, while sugar beets were not regulated in 1963 and 1964 and again in 1967 and 1968.

industry. This high fixed cost ratio is generated by the large quantities of expensive, specialized machinery, needed to cultivate, harvest, and process sugar beets and sugar cane into refined sugar.

Some productive flexibility can be utilized by adjusting sugar production, from year to year, up to the level of processing capacity. Sugar cane, on the other hand, is not a yearly crop; and the necessary commitment of resources over a varying period of years requires a more thorough projection and analysis of future profits and returns.

The planting of sugar cane is very expensive, but each root system will yield more than one crop or ratoon. The number of ratoons will vary according to the area (it may be as many as eight in Cuba). The necessary long term commitment to sugar cane gives rise to a cyclic effect which can be referred to as cane sugar cycle.

In the United States, resources are bribed into sugar production by means of a subsidy, or technically, a conditional payment. Although these payments are financed out of import duties on foreign sugar, the final cost is still borne by the consumers of sugar in the form of higher sugar prices.[4]

The forced transfer of resources to the sugar industry which is stimulated by subsidy payments discourages the free flow of these resources to their most profitable and productive uses. This cost of the sugar subsidy is, again, borne by the consumer and may be measured in opportunity or alternative costs.

Productive Capacity

The capacity for sugar production within the continental United

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[4]Further analysis of this problem appears in Chapter IV entitled, "An Evaluation of Sugar Legislation," p. 38.

States has continued to expand, even during periods when low cost sugar was available from foreign suppliers. This growth has been fostered and protected by sugar legislation which established domestic prices high enough to make expansion possible.

Domestic sugar beet acreage has expanded from 979,000 acres in 1960 (67, p. 5) to 1,240,000 acres in 1966; (65, p. 29) and from 1962 to 1967 six new sugar beet plants went into operation under the special expansion clauses of the Sugar Act (54, p. 13).[5]

The domestic cane industry has undergone similar capacity growth during the early 1960's. Florida has six new grinding mills for processing the cane harvested from more than quadruple the harvested acreage of 1959-1960 (64, p. 19).

One additional mill is operating in Louisiana, and the grinding capacity has been increased in the existing facilities to allow for the processing of almost 20 per cent more sugar cane in 1967 than was processed in 1960 (67, p. 47; 64, p. 30).

The annual melt capacity of the 24 sugar refineries operating in the United States was estimated to be 8,250,000 tons in 1966, while the actual melt volume was 7,173,272 tons or, in other words, about 85 per cent of capacity.

As a result of the normal availability of low-priced sugar from foreign suppliers who wish to have a share in the U. S. sugar market, and with an eye to the legislatively controlled growth of sugar production within the United States, it is doubtful that sugar supplies available to

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[5]The six new sugar beet plant's allotments totaling 153,230 acres and an additional 14,585 acres were allocated for the expansion of existing facilities (31, p. 12). In 1966, there were 62 sugar beet plants operating in this country (three additional plants were not in operation), (65, p. 29).

this country will feel the squeeze of capacity for many years to come.

Weather

Man can control many of the factors which influence the amount of sugar which he produces, but he has not yet learned successfully how to control the weather. Wind, rain, and temperature have a very substantial, and often unpredictable, effect on the quantity and the quality of any given sugar crop.

Although sugar beets and sugar cane are both hardy crops, they are still greatly influenced by changes in the weather. An early freeze, a heat wave, a tropical hurricane, a drought, or even an untimely rainstorm may bring sudden disaster to a sugar producer. A healthy crop can become a total loss in a short period of time under adverse weather conditions.

Ideal growing conditions vary between beets and sugar cane, but both have a set of basic growth requirements that must be met if the crop is to develop properly. They need enough moisture and cultivation, plenty of sunlight and an adequate growing season. Unfortunately, nature does not always cooperate with the sugar growers.

It is also important to realize that "climatic effects often hold the key to diseases which attack the sugar plant." (10, p. 166) Beet seeds may germinate too slowly in cold weather to produce strong seedlings. Long periods of hot damp weather may increase susceptibility to fungus growths, and insect pests may be encouraged or discouraged by particular climatic conditions.

Cold temperature may destroy all or part of a sugar cane crop, as happened to much of the Louisiana cane crop after a freeze in 1966. Hot

weather may not be the cure-all either, because a heat spell near the harvest time for sugar cane will limit the sugar content. Beet farmers are especially conscious of the temperature because they want to leave their beets in the ground as long as possible, but they must be careful because a sudden cold spell may lower sugar content or even make it impossible to harvest the beets at all.

Adequate rainfall or proper irrigation is essential to a good crop of sugar cane, but a rainy season during the maturing or ripening season lowers the sugar content, makes the sugar cane difficult to separate, and the harvesting of the crop almost impossible on account of the mud (48, p. 11). Long stormy periods will also shield the crops from the important sunshine which they require to produce sucrose and the sugar content will be below par.

Normal weather conditions, although extremely important, are not as potentially devastating as natural disasters: one excellent example is Hurricane Flora which dealt Cuba a loss of between 500,000 and 1,000,000 tons of sugar for the 1962-1963 cane crop (29, p. 17). Strong winds can lay the shallow rooted cane right to the ground with relative ease, causing serious damage and increasing the cost of harvesting the flattened cane.

It is nearly impossible to estimate what the elements hold in store for any given sugar crop, but one thing is certain: the weather will be a prime factor in deciding the success or failure of any sugar-yielding crop.

Technology (Its Effect on Supply)

The sugar industry has benefited immeasurably from the scientific development of better farming and production techniques. Great strides

have been made toward the more effective use of insecticides and weedicides, the improved use of animal and chemical fertilizers, and the better application of water resources. One single development, that of the monogerm-hybrid sugar beet and an annual seed crop from the same "has had an impact on the sugar beet industry equal to that from farm mechanization." (17, p. 8)

Improvements have also been made in selection of varieties of cane and beets to be grown in specific production areas. In Florida, for example, more than 125,000 different varieties of cane have been propagated to seek out the best possible strain for the unique growing conditions in the Everglades (40, p. 53). New crosses are constantly being developed to combat disease, pests, and other growth limiting factors.

Yield per acre and sugar content have been greatly upgraded as a result of improved technology. Average beet yields in the United States are not over 17 tons per harvested acre, as compared to less than 11 tons in 1933 (52, p. 60). On the mainland, cane yields per acre reached 30.8 tons in Florida and 20.08 tons per acre in Louisiana during 1966-1967 (22, p. 53-54). Each ton of sugar beets processed during 1966 yielded an average of 258 pounds of refined sugar (65, p. 30), while the average yield on a ton of cane was 192 pounds (raw value) (64, p. 30). The highest sugar yielding cane comes from Hawaii, where more than 2 million dollars are spent on research each year. Each acre planted in cane will yield an average of 11 tons of sugar (22, p. 21).

Improved technology has not stopped at the edge of the cane and beet fields. As sugar mills and factories seek better ways to extract sucrose from the plants, the refiners are working to develop more efficient refining and transportation techniques. Several indications of progress have

been the elimination of the quality differential between cane and beet sugar and the improvements in bulk and liquid sugar which have so thoroughly altered sugar transportation and handling during recent years.

Technology has had a powerful influence on the supply of sugar, and as new development reach the backward and developing production areas, large additional quantities of sugar should become available to help offset the growing sugar requirements of the United States and the world.

Legislation

Sugar is so thoroughly regulated by law that the supply of sugar in this country is highly dependent on sugar legislation. Virtually every pound of sugar consumed in the United States has been controlled, taxed, or subsidized in an effort to promote a smooth and orderly flow of sugar to the market.

A later section of this work describes in detail the workings of the Sugar Act of 1948, as amended, but it should be noted here that the supply of sugar available to consumers in this country is highly dependent on the legislative policies that have been initiated to regulate the production and the importation of sugar.

Mechanization

In the sugar beet industry "complete mechanization has been fully accomplished in all phases of the crop with exception of the removal of some excess plants and weeds during the early grow stages" (45, p. 30) and the shortage of costly hand or stoop labor is no longer a major stumbling block within the beet industry.

Sugar beets are now planted by precise machinery through the use of monogerm seeds, and mechanical thinners and weed controlling chemicals

take the place of short-handled hoes in the field. When the crop matures, the harvesting of the beets is also done mechanically as one machine plows up the beets, slices off the tops and loads them into a truck.

The domestic cane industry has also followed a rapid course of mechanized operation which has eliminated most of the hand labor once associated with the growing of sugar cane. New machines are constantly being developed to further promote the mechanization in the cane fields of Louisiana and Florida. The sugar cane industry in Hawaii is already one of the most highly mechanized in the world (22, p. 8); and in Puerto Rico, although sugar producers are seeking to eliminate the need for costly hand labor, they are well behind the domestic cane growers and Hawaii in this regard.[6]

Specially designed machinery can now be used to plant, cultivate, and harvest sugar cane. The cane crops have also benefited from the development of better herbicides and pesticides that have lowered the number of man hours required in the fields.

As the sugar-bearing crops leave the field they are processed in highly automated and mechanized plants. Today raw sugar from the cane areas is generally transported to refineries in bulk shipment with considerable savings in labor and dollar costs.

Liquid sugar has eliminated much of the handling once associated with sugar in the industrial market. Shipments to consumers, in liquid form or in bulk, now comprise the majority of sugar used in the industrial segment of the market, saving time and expensive labor charges.

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[6]Although wages in the sugar cane fields of Puerto Rico are extremely low, the very low marginal productivity of labor makes an expensive component in Puerto Rican sugar production.

The high price of hand labor in the United States became a major contributing factor to the speed with which the sugar industry went about its process of mechanization--a process which has left it much better equipped to meet the demand for sugar production not only today but in a future which will require much more sucrose to fill growing consumption requirements.

Other Factors

The political impact on the supply of sugar can best be illustrated by a single political situation which developed during 1960. As Castro's government in Cuba became unfriendly to the United States, the door to Cuban sugar was closed and the largest supplier to the United States market (normally producing about one-third of our sugar needs) was locked out. The quantity of sucrose involved in this abrupt change in supply was enormous. A change in the attitude of Cuba's government could again make Cuba eligible as a sugar supplier to the United States, reversing the process.

Political uncertainty also acts as a supply depressant in areas where the political climate is neither stable enough nor inviting enough to attract the necessary capital to develop the sugar industry. Improved political conditions, especially in Latin America, could open large new reservoirs of potential sugar production.

The time element is also of importance in any consideration of supply because of the amount of time it takes to develop new planting areas and to expand processing facilities.

Traditional levels of over-abundant supply often cause large producers of cane, as in Cuba or Australia, to leave significant quantities of cane

standing in the fields as an insurance or booster crop. As a result, sugar supplies can often be readily augmented by "harvesting and grinding cane left standing from previous crops." (25, p. 10) If such buffer crops are not available and reserve surpluses are drawn to a low level as they were in 1963, then a time lag will exist between the period of shortage and the adjustment of sugar suppliers to fill demand.

The distance over which critical supplies of sugar travel to reach the United States leaves supply vulnerable to any crises of a military nature which affects water transportation. During World War II, for example, the threat of German "U-boats" even challenged sugar shipments from Cuba, which is only 90 miles off the coast of the U. S. mainland. This logistics problem is a prime reason for the emphasis on a strong domestic sugar industry.

CHAPTER III

SUGAR LEGISLATION TODAY

The Sugar Act of 1948 as amended in 1951, 1956, 1960, 1961, 1962, and 1965 is the basis for current legislation covering sugar in the United States today. The current program will be in force until December 31, 1971, unless amended.

Although the Sugar Act and the market with which it deals have changed considerably since 1948, it still fosters the same three basic objectives:

(1) to protect the welfare of the United States sugar industry;

(2) to provide consumers in the United States with an adequate supply of sugar at a reasonable price; and

(3) to promote and strengthen the export trade of the United States.

The basic tool in pursuing these objectives is still a system of quotas which allocates shares of the sugar consumption of the United States among supplying areas and regulates the amount of sugar available in the marketplace on a year-to-year basis. Sugar legislation thereby controls quantity and the source for sugar supplies entering the United States.

There are five basic areas of concern in the implementation of current sugar legislation. They are consumption requirements, quotas, marketing allotments, proportional shares, and grower payments.

Consumption Requirements

The Secretary of Agriculture estimates between October 1 and December 31, how much sugar will be required by U. S. consumers during the following year. This amount may be adjusted if it is found to be inadequate or if

surpluses are gathering; both of these situations would probably stimulate changes in sugar prices which would result in quota adjustments under the target price section of the Act.

In making the original estimate, the Secretary of Agriculture uses as a base, the quantity of sugar distributed during the previous 12 months. He must then allow for surpluses or deficits in the nation's sugar inventories and for any apparent changes in the level of consumption.

The Secretary must also consider the relationship between the parity index and the price of raw sugar to make certain that prices are high enough to encourage domestic sugar producers to plant sugar-bearing crops but not so high as to be unusual or unreasonable to sugar consumers.

A public hearing is held each year during the October to December period to allow individuals to express their feelings regarding the level of consumption and the resulting price for sugar.

Establishing Quotas

Once the level of consumption has been established, the total sugar requirement is divided among the various producing areas by means of quotas. Tables showing the quota breakdowns for 1952, 1959, 1963 and 1964 can be found in the Appendix on pages 116 to 122, and a current quota breakdown is included on pages 123 and 124.

There are four domestic sugar producing areas; mainland cane producers, mainland beet producers, Hawaii, and Puerto Rico. A base quota of 6,390,000 tons is assigned to these domestic areas.

Mainland cane and beet growers share in 65 per cent of any growth in excess of 10.4 million tons of sugar consumption and their quotas decrease at the same rate if consumption falls below 9.7 million tons. This growth

or contraction is shared on a quota holding basis of roughly 75 per cent to beet sugar and 25 per cent to cane sugar.

The three remaining domestic producers are given additional marketing quotas, within reason, whenever their production exceeds their established quotas. These additional quotas are developed by reducing the quotas allotted to foreign suppliers, other than the Philippines, Ireland, and the Bahama Islands.

The Philippines have had a quota of 1,050,000 tons since 1962 and under the amended Act of 1965 will share in any increase above the 9.7 million ton level at a rate of 10.86 per cent, up to the 10.4 million ton requirement.

The only other fixed quotas belong to Ireland (5,351 tons) and the Bahama Islands (10,000 tons). All other foreign producers are given a percentage of the remaining U. S. sugar requirements.

The President still has the power to regulate the quotas in the national interest by restriction or even elimination of the quota of any country with whom we do not have a healthy relationship. For example, in 1966, Southern Rhodesia's entire quota was withheld and pro-rated to other Western Hemisphere countries (69, p. 4).

Any quota withheld in this manner is pro-rated to quota-holding nations other than the Philippines, Ireland, and the Bahamas, as long as consumption is below the 10,000,000 ton level. Above that level, it is divided among member countries of the Organization of American States in proportion to their base quotas.

The sugar imported under these import quotas is to be raw sugar, except that from Ireland, and small quantities of refined sugar from Panama and the Philippine Islands. Any sugar not more than 99 per cent pure is considered to be raw, and acceptable under this definition.

Under unusual circumstances (such as the ones that existed in 1963-1964), the Secretary of Agriculture is now free to go outside the quota formula to find sugar where it is available, if he is unable to obtain adequate sugar supplies under the provision of the Sugar Act. Again, the country dealt with must have diplomatic relations with the United States, and special consideration is given to those nations purchasing agricultural exports from this country.

Fifty per cent of the non-specific quotas (percentage quotas) are still reserved for Cuba until such time as diplomatic relations are once again resumed between the United States and Cuba.

When a producing area cannot provide enough sugar to meet its quota, the unused portion is allocated according to a pre-determined formula. Any deficit in domestic areas and Western Hemisphere countires (except the Bahama Islands) is met by first allocating 47.22 per cent to the Republic of the Philippines and then assigning the remainder to other Western Hemisphere countries, other than the Bahama Islands, on the basis of their quotas. The one exception is the members of the Central American Common Market, whose quotas can only be allocated to other countries who are members of that organization.

Deficiencies in the Eastern Hemisphere and the Bahama Islands are handled in the same way, with 47.22 per cent going to the Philippines and the remainder being pro-rated to the other quota holders in that hemisphere (excluding Ireland).

If the Republic of the Philippines is unable to fill its own quota, the unfilled quota is pro-rated to all quota-holding producers in both hemispheres. However, the Philippines' share of any unfilled or deficit quotas from Western Hemisphere producers will be allocated only to other countries in that same hemisphere.

Whenever a country fails to fill its quota without adequate justification, its quota may be permanently reduced. The reduction would equal the lesser of the shortfall, or the difference between 115 per cent of the quota, less the actual import for the year in which the quota was not filled.

Marketing Allotments

One of the basic objectives of sugar legislation is to promote the orderly marketing of sugar. Controlling the importation of foreign sugar by means of quotas may not accomplish this purpose if the domestic areas produce enough sugar to materially exceed their quotas. When enough sugar is produced to exceed established marketing quotas, producers are likely to rush into the market to sell before the quotas are filled.

To eliminate the oversupply caused by panicky selling and the resulting drop in sugar prices, the Secretary of Agriculture may assign market shares or market allotments to each of the major producers in the market place. For example, each of the 14 beet producers might be given an allotment based on past selling records and current production, in order to equally share sugar sales and thereby control the flow of sugar into the market. The marketing allotment will also reflect the number of proportional shares or individual farm shares represented by the producers..

Proportional Shares

To make certain that the farms in the domestic production areas get a fair share of the available market, the Secretary may further divide the sugar market for any producing area into proportional shares for each farm. This is normally not done unless production appears to be running well ahead of quota figures.

In mainland cane and sugar beet areas, these shares are established in terms of acres, while in Puerto Rico, the allocation reflects the estimated recoverable sugar in the crop. The purpose for assigning proportional shares is to adjust production to quota levels and to allow for an equal sharing of the available market. The shares are determined on the basis of past production and the current ability of the farm to produce sugar yielding crops.

The act also requires the Secretary to protect the interest of small farms and new producers, as well as sharecroppers, and to take into account any abnormal or uncontrollable conditions which may have influenced recent crops in a particular area, such as natural disasters.

Producers who do not stay within their assigned acreage allotments forfeit a portion of their conditional payments which make up an important part of their income. Generally, processors will refuse to buy sugar grown in excess of proportional shares, because sugar produced on such acreage is not considered in establishing marketing allotments for the producers.

Conditional Payments

Conditional payments to sugar cane and beet growers actually serve three basic purposes:

(1) they help supplement the income received from sugar crops and thereby encourage sugar production;

(2) they serve as a control apparatus to assure growers and field workers a fair share in the returns from the crop; and

(3) they work toward keeping child labor out of the fields.

These last two objectives are accomplished by withholding payments from farmers who do not pay the established minimum wages to their labor or who

employ child labor in their fields.

In the case of growers who are also processors, a fair price must be paid for the cane or beet crops which they purchase to qualify them for payments on their own production.

The rate of the conditional payment changes according to the level of production. The highest rate is 0.8 cents per pound of sugar, raw value, or 16 dollars per ton of sugar, which is paid on the first 350 tons produced. The rate falls progressively to 0.3 cents per pound of 6 dollars per ton on all sugar produced in excess of 30,000 tons.

The conditional payment program is supported by an excise tax of 0.5 cents per pound, which is charged against the cane refiners. The tax has more than offset payments to growers; in fact, the U. S. Treasury has shown a net profit of more than 550 million dollars from this phase of the program from 1938 to the end of the fiscal year 1966 (28, p. 14).

Special payments are sometimes made in the case of crop deficiency or abandonment of crops because of natural disasters such as fire, flood, frost, drought, or insects. These payments are only made when disasters have caused damage to all or a substantial part of the sugar crop in the producing area where the farm is located.

The reference to child labor in the conditional payment section of sugar legislation seems slightly ambiguous, as it would suggest that the U.S.D.A. is only worried about the use of child labor in the growing and processing of sugar-bearing crops and not in other agricultural pursuits. Although the ultimate objective of this particular portion of the law is most worthwhile, it does seem to be misplaced.

A limited amount of sugar travels under quota exemptions. The first 10 tons of sugar or liquid sugar imported from any country other than Cuba and the Republic of the Philippines can be imported without quota allocation.

An additional 10 tons may also be imported without a quota if it is used for religious, sacramental, educational, or experimental purposes, once again with the exclusion of sugar from Cuba and the Republic of the Philippines.

Liquid sugar in individually sealed containers of less than one and one-tenth gallon capacity may also enter the United States without a quota, unless it comes from Cuba or the Philippines; and finally, any sugar (dry or liquid) produced or imported for livestock feed, distillation of alcohol (not for human consumption) or for export as sugar or in sugar containing products, will not require quota allocations.

CHAPTER IV

AN EVALUATION OF SUGAR LEGISLATION

Most of the literature and available data on sugar legislation is published by either the sugar industry or government agencies involved in implementing sugar legislation. The resulting bias of opinion and criticism does little to consider the economic costs of the legislative control of sugar to the over-all economy and specifically to sugar consumers in the United States.

One of the objectives of the Sugar Act is to protect the U. S. sugar industry. Provisions are included to insure that a sizeable proportion of sugar consumed in the United States is produced within this country and that sugar prices are high enough to provide equitable returns to the various segments of the sugar industry.

In defense of the policy of protection, the national security argument has been used most frequently to point out the importance of producing sizeable quantities of sugar at home. The important consideration in this argument is the possible influence of military action on the availability and successful operation of water transportation which brings raw sugar to the United States.

As military emphasis has been shifted to push-button missile warfare, the potential duration of military confrontations has been drastically reduced, thereby weakening the national defense argument.

Other arguments for protection are also advanced, but most of these center on short-run considerations for the welfare of individuals employed in sugar production in the United States. The strength of these arguments

is enhanced by the number of states involved in sugar production which tends to promote a great deal of legislative hostility toward unfavorable sugar legislation. The sugar industry is also represented by powerful lobby forces in the nation's capital which tend to influence the laws which govern sugar.

The second objective of sugar legislation has been to provide adequate supplies of sugar at reasonable prices, and the supporters of current legislative policies point to the many years when sugar has been readily available and prices were relatively stable as an indication of the successful fulfillment of their objective. It is highly possible, however, that the almost chronic availability of surplus sugar production in the world may have been equally important, or even more important, than sugar legislation in insuring the available supply of sugar for the United States.[1]

Another important question is how reasonable are reasonable prices? Most of the sugar produced in the United States is high-cost sugar which could be unable to compete in an open or free sugar market. Not only are sugar prices maintained at high levels to insure a certain percentage of "home" production, but sugar growers are also subsidized by means of conditional payments which are financed by charging a duty on all foreign sugar.

Sugar prices are, therefore, certainly not as reasonable as they could be in a free market or even under a system similar to the Commonwealth Sugar Agreement which insures Britain's sugar supply and prices by

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[1]The problems encountered during the only period of serious supply difficulties at the world level in recent years (1963-1964) would tend to support this argument, although it must be pointed out that sugar legislation from 1960 to 1965 was not as carefully prepared to handle supply emergencies as was sugar law prior to and following that period.

means of long-term contracts.

High sugar prices reduce the economic welfare of the United States citizen because the incidence of high sugar prices falls squarely on the shoulders of the consumer. One measure of these costs can be found by examining the supply curve on page 69. Note that the quantity of sugar demanded at the selected target price could easily be obtained at a much lower price.[2]

If sugar were traded in a free market, it might be argued that there would be no guarantees for either supply or price. This is true, but the long-term trends which have promoted a rather constant surplus sugar condition in the world (and low world prices) could be expected to provide adequate compensation for this market risk. If continuity of supply and price are absolutely essential, it might be possible to buy and store quantities of sugar as buffer or insurance stocks at a cost to sugar consumers well below what they are now paying.

The welfare or social costs of current sugar legislation must also include consideration for the productive losses sustained by diverting resources into the sugar industry (through subsidization) which could have been more efficiently allocated. A fair estimate of these costs would involve an opportunity cost evaluation for each of the various segments of the sugar industry.[3]

There are sugar producers in the United States who could, no doubt, compete successfully on a cost basis with much of the world's sugar. Increased market competition would, however, eliminate a large percentage

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[2]This curve excludes some potential suppliers; (Potential Supply vs. Eligible Supply).

[3]It is possible that some of the resources used (i.e., Everglad cane land) might not have other productive application.

of the marginal sugar production in the United States, freeing resources for other applications.

The final objective of sugar legislation is to promote the export trade of the United States. In the short run it is probable that Congress had hoped to tie the sugar quota system into a bilateral trade situation, where surplus U. S. Agricultural commodities could be traded for sugar. Very few sugar suppliers have been willing to operate on this basis. In 1963, for example, when future quota arrangements were being considered, only two nations responded favorably to this barter arrangement. Brazil offered 100 per cent of its net receipts and South Africa indicated that it would use 40 per cent of its net receipts in purchase of surplus U. S. Agricultural commodities (68, p. 6).

In the long run, the continued economic growth and improved trading potential which could be stimulated in sugar producing areas (notably, South and Central America), by allowing for greater participation in the U. S. sugar market, could have a very favorable and far-reaching influence on the future trade and balance of payments position of the United States. Such participation will be limited under current sugar legislation, however, by the continued expansion of domestic sugar production.

CHAPTER V

SOURCES OF SUGAR SUPPLIES

The sugar from sugar cane or sugar beets, which grows in virtually every corner of the world, has a pre-determined destination or ultimate consumption home, even before it is produced. Legislation similar to our own "Sugar Act" and the British "Commonwealth Sugar Agreement" channelizes about 90 per cent of the world's sugar production into ridgid avenues of trade. Only surplus or homeless sugars are freely traded on the so-called World Sugar Market.

Sugar entering the United States has been regulated by a system of quotas since the mid-1930's. In normal times, quota shares in the U. S. market have been considered prized holdings because of the fact that sugar prices in this country are normally higher than can be obtained in any other market. In international circles, U. S. sugar quotas, because of their value, have been even used as inducements for closer ties with this country or to encourage purchase of U. S. agricultural surpluses.

The sugar supply situation was complicated in 1960 by the loss of Cuba as a supplier. Filling the void left by the large sugar shipments normally arriving from Cuba required a major shift in the supply sources utilized to provide for this country's sugar needs. Temporary measures, which opened a portion of the U. S. market to a first-come, first served, or "global quota" arrangement, were replaced in 1965 by a long list of foreign quota holders who now share in U. S. sugar requirements on a percentage basis.

In 1968 there were a total of 29 foreign countries (excluding the

Philippines) which have established sugar quotas. (A complete explanation of the quota system is provided in Appendix A, A Brief History of Sugar Legislation.)

More than 70 per cent of the sugar being used in the United States is produced in domestic beet and cane areas--Hawaii, Puerto Rico, and the Republic of the Philippines. Each of these primary supply areas merits closer consideration.

Mainland Sugar Production

The largest quota share of U. S. sugar requirements (nearly 40 per cent) is filled by mainland production. Sugar is produced from sugar beets grown in many areas within the continental United States and from sugar cane produced in Louisiana and Florida. A growing proportion of total sugar demand in this country is guaranteed to these same domestic producers by legislation which allocates 65 per cent of any increase above the 10.4 million ton consumption level to domestic sugar beet and sugar cane growers.

Domestic Beet Industry

It would have been difficult for the pioneers of the sugar beet industry whose first successful plant was opened in 1870 to envision that by 1966, less than 100 years later, sugar beets would be growing in 21 states, and that more than 60 sugar beet processing plants would be in operation with gross returns to the sugar beet industry totaling well over half a billion dollars per year.

More than five billion pounds of beet sugar are now being produced in the United States each year or enough sucrose to satisfy more than 25 per cent of this country's consumption requirements. This is the most

sugar provided by any single producing area.

In 1966 well over 20 million tons of sugar beets were grown on the 1,240,000 acres of farm land selected for beet production. The average yield from an acre was 17.6 tons of beets with a sugar content that averaged out at 15.54 per cent.

Under the special expansion sections of current sugar legislation, the domestic beet industry has built six new beet factories since 1963. These factoris are located in:

(1) the panhandle of texas; (2) Drayton, North Dakota;

(3) Central New York state; (4) Phoenix, Arizona;

(5) Arovstook, Maine; (6) Mendota, California.

Further expansion was also made possible in other areas which were already represented by an operating sugar beet factory.

Fewer farms are involved in the production of sugar beets today (20,067 in 1966 as compared to 31,323 in 1948) (67, p. 11; 65, p. 32); but these farms on the average are larger and more efficient and, of course, benefit handsomely from the mechanization and continued technological developments within the sugar beet industry.

The gross return on a ton of beets in the United States during 1966 averaged 15.08 dollars per ton, and the gross receipts to farmers from sugar beet sales and conditional payments was more than 307 million dollars.

The 1967 sugar beet crop was well below production levels of the two previous years and considerably below the record production of 3,322,113 tons of beet sugar produced in 1964. Because the quota for domestic beet sugar was not filled, Congress was prompted to legislative action which removed all acreage restrictions again in 1968.

Farmers have responded to the open production quota in 1968 by planting 1,414,000 acres in sugar beets, an 18 per cent increase over 1967. The sugar yield on the current crop is estimated to be around 3.2 million tons, or just under the record production of 1964 (66, p. 2).

Mainland Cane

Sugar cane is grown for the production of sugar in only two states within the continental United States, Louisiana and Florida. Production in both of these areas has grown rapidly in the past few years, especially when no quota restrictions were enforced, and today sugar cane is one of the most important agricultural commodities produced in either state.

In 1966 well over 2,200 farms were engaged in producing sugar cane for some 56 operational sugar mills. The sugar production for 1966 was 1,211,000 tons at an average yield of 26.3 tons of cane per acre.[1] (64, p. 29-30)

Harvested acreage for 1966 showed an increase of 45 per cent over 1960. Most of this growth was registered in Florida where roughly 190,700 acres were harvested in 1966 as compared to 48,000 acres in 1960 (64, p. 29; 67, p. 37, 52).

In 1966, gross returns to cane growers in the mainland areas exceeded 124 million dollars. This total was divided fairly evenly between the two states and does not take into account the returns to processors.

The 1967-1968 sugar crop in Florida is expected to yield well over 714,000 tons of sucrose. When this total is added to current production in Louisiana of some 740,000 tons of sugar, the result should be a record

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[1]Each ton of cane yielded 192 pounds of raw sugar (64, p. 30).

cane sugar crop of more than 1,454,000 tons. This figure is even more impressive when it is viewed in light of recent reductions in acreage allotments (12 per cent in 1965, and an additional 5 per cent in 1968) and is compared to the record crop in 1966-1967 of 1,212,000 tons of sugar (66, p. 2).

Production in the mainland cane industry is highly mechanized; and, as is the case in sugar beets, the trend is to larger, more efficient farms. Average man hours per acre of cane in the mainland area, for example, are about one-third of that which is required in Puerto Rico; and the average man hours per ton of sugar is an even lower percentage (63, p. 36).

The growth potential of the cane industry in the continental United States is quite impressive. In Florida, cane is suited for production on between one and one-half to two million acres of rich everglad soil (40, p. 13). Additional acreage is also available in Louisiana. It is not inconceivable that enough sugar could be produced by Florida and Louisiana to provide for current sugar consumption in the United States.

Further expansion is, of course, limited by law and the growing sugar surpluses in the mainland cane areas might even bring additional acreage restrictions for the 1968-1969 crop.

Hawaii

Although Hawaii received statehood in 1959, its sugar production is still considered separately from that of the mainland. The growing of sugar cane on the islands of Hawaii dates back to early attempts made by the Chinese in 1802 to produce sugar on the Island of Lanai. Successful production goes back to 1835 (22, p. 5-8).

Most of the development and growth of the Hawaiian sugar industry took place following the signing of the Treaty of Reciprocity with the United States and as a result of the later annexation of Hawaii as a U. S. Territory in 1898. Favorable treatment in the U. S. sugar market has been a prime consideration in the successful operation of Hawaii's sugar industry.

The 1966 sugar crop was estimated to have a value of 191 million dollars making sugar the largest industry in Hawaii. More than 12,000 year-round employees are hired by the islands' sugar industry which pays out over 69 million dollars in payroll alone.

Roughly 95 per cent of Hawaii's sugar crop is exported to the mainland and the remainder is consumed in Hawaii. Usually, Hawaii provides just under 10 per cent of the sucrose needs of the United States.

Because of the shortage of good tillable land, the story of Hawaii's sugar industry is one of constant research and study in an effort to maximize sugar yields. More than 2.5 million dollars is spent in Hawaii on sugar research every year. This same shortage of good land also limits effective expansion of the sugar industry in Hawaii.

In 1967, Hawaii produced 1,191,042 tons of sugar (raw value), about 3.5 per cent under the record production of 1,234,121 tons in 1966 (40, p. 4). Although Hawaiian sugar is given a quota in the U. S. market (1,200,000 tons), special consideration is given to any production above quota levels.

The role of sugar in the economy of Hawaii and the importance of the sugar supplied by Hawaii to the United States market seems well assured for many years to come.

Philippines

The Republic of the Philippines is a group of some 7,100 islands which lie off the coast of southeast Asia. Only 730 of the islands are inhabited, and only 4,300 even have names (77, p. 333). The Philippine climate is warm and humid and is very similar to that of Central America. The rainfall is quite heavy and average temperatures vary little during the year (12, p. 3-5).

The growing conditions in the Philippines are very suited to the production of sugar cane which was established in the islands even before Magellan arrived in 1521 (47, p. 649). No sugar industry of any size was developed under early Spanish rule, but small shipments of sugar were exported during the 1800's under the rule of the Franciscan Order (50, p. 8-9).

From 1931 to 1961 the Republic of the Philippines ranked second only to Cuba as a supplier of sugar to the U. S. market (45, p. 41). Today the Philippines are this country's largest foreign supplier of sugar, providing nearly 10 per cent of the total U. S. sugar needs. The 1967 sugar quota for the Philippines (including pro-rations) was 1,126,020 tons (64, p. 18).

Sugar makes up about 25 per cent of the annual exports of the Philippines and the gross income generated by the 1967 sugar crop of some 1,720,000 tons was estimated to be 750 million dollars (45, p. 41-43).

Recently the construction of five new sugar mills was authorized by President Marcos and continued growth of sugar production in the Republic of the Philippines is expected for many years to come. The role of Philippine sugar in the U. S. market is assured by the size of its basic quota and a lion's share of additional pro-rations from the unfilled quotas of other areas.

Puerto Rico

Puerto Rico is an island territory of the United States which is situated about 1,000 miles from Florida in the warm Carribean Ocean. Sunshine and warm trade winds provide Puerto Rico with a warm tropical climate and, normally, a heavy rainfall.

Sugar fist came to Puerto Rico from Santa Domingo in 1521, and as early as 1550 there were ten sugar mills in operation on the island. The growth of the sugar industry was very slow under the Spaniards because of the limitations on exports and the ban on foreigners (50, p. 8).

In 1898, when Spain ceded Puerto Rico to the United States, the sugar industry at last began to gain momentum. Puerto Rican sugar was given a tax-free status in the U. S. market and investments from the United States boosted sugar production substantially.

The drive toward industrialization and diversification has caused Puerto Rico's sugar industry to decline in relative importance to the over-all economy. At the same time the actual size of Puerto Rico's sugar exports has also been decreasing.

Sugar production in 1967 was the lowest in more than 20 years, only 818,294 tons of sugar (raw value). This represented a decrease of some 65,000 tons under the poor crop of 1966 (63, p. 5).

The physical reduction in Puerto Rico's sugar crop and the corresponding deficit in her sugar quota can be partially explained by the prolonged drought which has caused a substantial decrease in average cane and sugar yields per acre in the past few years. Another factor which bears mentioning is that fewer farms are producing sugar cane in Puerto Rico each year; and although most of the farms which have been forced out of production were small marginal producers, fewer and fewer

acres of sugar cane are being planted each year (46, p. 16).

The marginal productivity of Puerto Rico's Agricultural labor is also a serious problem. Man hours expended per acre of cane and man hours per ton of sugar are higher in Puerto Rico than for any other domestic production area, and total labor costs are also the highest of any domestic producer in spite of the fact that average wages in Puerto Rico's sugar fields are lower than those paid by any domestic supplier (63, p. 36; 46, p. 12).

The decrease of Puerto Rico's sugar industry may alter her significance as a prime supplier to the U. S. sugar market unless current trends are checked or reversed. Puerto Rico is still capable of producing large quantities of sugar, however, and even at the reduced level of current sugar production provides significant quantities of sugar to the United States market.

Other Sources

The large number of foreign suppliers in the United States sugar market offers a vast geographic origin to sugar consumed in this country. Thirty foreign countries held sugar quotas during 1967, but sugar was actually purchased from 37 nations (64, p. 19-20).

The list of off-shore foreign sugar suppliers includes our immediate neighbors, Mexico and Canada, numerous South and Central American countries and far off suppliers like Thailand the Fiji Islands.

The method of allocating quotas and dealing with this large group of scattered suppliers is explained in the section dealing with sugar legislation today.

It could be noted here, however, that the source of supply now utilized to fill this nation's sugar needs offers a sharp contrast in

number and diversity to the rather simple supply formula in pre-Castro days.[2]

Sugar Refining Industry

Any discussion of the sources of sugar supplies must logically include reference to the sugar refining industry. The majority of the sugar imported and consumed in the United States is cane sugar which must go through a final refining process. This processing of domestic and imported raw sugars is completed by the sugar refiners.

Sucrose was refined in this country as early as 1689. This initial venture and the later expansion of the early refining trade centered in New York City, and by the late 1800's a healthy colony of sugar refiners were operating in that city (73, p. 145).

Geographic expansion of the sugar refining industry along the ocean waterways was accomplished to facilitate the transportation of incoming raw sugar supplies and to allow easy access to population centers. The location of sugar refineries today still focuses on the eastern seaboard although there are several refiners along the Gulf coast and one large plant on the west coast.

A total of 24 sugar refineries are in operation today with more than 17,000 persons employed directly in this industry and a payroll in excess of 100 million dollars a year (22, p. 29). Expanding sugar consumption and heavy fixed costs in equipment continue to require large amounts of gross investment for refiners to stay abreast of the sugar market. The refining process for sugar is dominated by a few powerful corporations

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[2]A complete list of quota holders and suppliers can be found in Table 7 and Table 8, Appendix C.

which have a tremendous impact on the distribution and the price of sugar in the United States.

Sugar refiners traditionally operate on a small gross profit margin, making their profits in the volume of refined sucrose.

CHAPTER VI

THE DEMAND FOR SWEETENERS

Sugar is the most important component in the sweetener market which includes a great variety of sweetening agents. In 1967 the per capita consumption of sweeteners in the United States was equivalent to 123.4 pounds of raw sugar (65, p. 7).

Sugar accounted for more than 80 per cent of total per capita sweetener consumption, while the remaining portion was divided among the competitive sweeteners with the largest share going to corn sweeteners and synthetic sweetening agents.

Sweeteners can be classified as being either nutritive or non-nutritive. The non-nutritive sweeteners are synthetic products which have recently increased in importance through the expanded market for low-calorie or diet foods and beverages.

The nutritive sweeteners would include sugar, corn sweeteners, honey, maple syrup, maple sugar, molasses, and other sweetening agents which have food value.

Sugar Demand

The per capita sugar consumption in the United States is just under 100 pounds per year. The demand for sugar created by this consumption takes two basic forms: direct demand for use in the homes and institutions of this country and derived demand, which is created when consumers purchase products containing sugar in process form.

About a quarter-century ago two-thirds of the sugar consumed in the United States was direct consumption (26, p. 4). As the demand for processed, packaged, and convenience foods has increased, this proportion has more than reversed itself, and today more than two-thirds of the sugar consumed in the United States is in processed form.

The shift toward derived demand is important in an analysis of the demand for sugar because of the inherent differences between the household consumer and the large industrial purchaser. Each set of market circumstances relates differently to the housewife buying a five-pound bag of sugar for her family than it does to an executive purchasing 10,000 tons of sugar for the making of confections.

The demand for sucrose is not merely limited to food products. Sugar is the purest organic chemical produced in any industry (36, p. 29); and non-food uses for sugar can be found in adhesives, fibers, paper, pesticides, plasticizers, soil conditioners, solvents, and surface coatings (36, p. 29). Some sugar is also used in the feeding of stock and the distilling of alcohol. The potential for expansion in non-food areas must be recognized in discussing the demand for sugar, even though very little sucrose is diverted into this area at the present time.

The demand for sugar in the United States is highly inelastic. Good substitutes are not available for many of the basic uses of sucrose and consumers in the United States appear to have reached a saturated level of per capita consumption. These facts tend to minimize the effects of price changes on sugar consumption.

It is revealing to examine the classical demand determinants to these determining factors one at a time to study their influence on the amount of sugar demanded in the United States.

Types and Number of Buyers

Every sugar consumer is technically a buyer so that the number of sugar buyers actually becomes a function of population. This statement is more understandable when one considers how difficult it would be to go through a day without using sugar in one form or another.

Realizing that everyone who consumes sugar is therefore technically a buyer, it is still important to work back into the market-place to see how the actual purchases of sugar are made and by whom they are made.

The first and most logical classification of buyers can be made by separating the industrial and the direct consumption market. The majority of purchases in the direct, or household, sector will be made by housewives or other representatives of the family unit. Other buyers in this section would represent hotels, restaurants, and other institutions which buy sugar for direct consumption.

As the demand for convenience and packaged foods increases, the buying emphasis is further shifted to the industrial and manufacturing segment of the economy. At the present time less than one-third of the sugar consumed in the United States is consumed as pure sucrose.

More sugar is being used by restaurants, hotels, etc., but this increase is not large enough to offset the continued growth in the use of sugar in processed forms. The per capita demand for sugar has remained rather constant, which simply means that people are letting someone else put the sugar on their cereal, and pre-cook their food.

Within the industrial segment of the sugar market the number of buyers, or manufacturers, and the average size of their purchases is increasing. As more sugar is routed through the industrial purchasers in the sugar market to be processed into convenient and packaged foods, the demand for

sucrose in consumer-sized packages will fall and bulk or liquid shipments of sugar will be substituted. The marketing structure of the sugar market must also adjust to changes in the actual and percentage volume moving to the industrial buyers.

Sugar consumers or purchasers in the industrial market according to their importance, are the beverage, baking, canning, confection, and dairy industries.

The per capita demand for sugar in its industrial uses is rather inelastic but much less so than in the household sector. The increased demand for light, low-calorie foods and the improved quality and acceptance of alternative sweeteners along with the attached price differential have stimulated increasing substitution in the industrial sugar market, thereby increasing the price elasticity of the demand for sugar.

A more careful and complete analysis of this situation follows in the section dealing with sugar substitutes.

Sugar Substitutes

> Since sugar serves as a sweetener, preservative, and supplier of energy, it must compete with other products used for these purposes. Among the other sweeteners competitive with sugar, the corn sweeteners are the most important. (10, p. 126)

Included in the family of corn sweeteners are corn syrup, dextrose, and corn syrup solids. The first of these, being by far the most important, accounts for more than two-thirds of the corn sweetener market.

Synthetic sweeteners are also used in place of sucrose. The most important synthetic products are saccharin, calcium cyclamate, and sodium cyclamate (also called sucaryl). The increased demand by weight conscious consumers for low-calorie foods and beverages has given rise to a strong new market for these non-nutritive sweeteners.

Honey, maple syrup, maple sugar, and molasses are also used as sweeteners, especially in the confectionary industry where special taste or texture is achieved through their use. Sorbitol and manitol are sometimes used to sweeten food products prepared specially for people with sugar diabetes, because of their salubrious effects on the diabetic. (59, p. 2)

In recent years the most serious competition for sucrose has come from the corn sweeteners. According to Tom Murphy, director of Sugar Policy for the Agricultural Stabilization and Conservation Service, the per capita consumption of nutritive sweeteners has increased from 116 pounds of raw sugar equivalent in 1948, to 123.4 pounds in 1967; and "corn syrup and dextrose have enjoyed all the business generated by the increased per capita consumption." (65, p. 7)

During that period when the prices for sugar and corn sweeteners on a dry basis were about equal (1952 through 1955), neither gained on the other (62, p. 5). Price equality has not existed since that time and corn sweeteners have made serious inroads into the sugar market especially at the price conscious industrial level. Corn sweeteners accounted for one-third of the 1,000,000 tons of sugar replaced by substitutes from 1956 to 1963 (62, p. 5).

The average price of corn sweeteners and dextrose shown as a percentage of sugar prices was 65 per cent for corn syrup and 82 per cent for dextrose, from 1962 to 1966 (65, p. 16). Corn sweeteners have maintained this downward price trend over past years which thereby encourages substitution on a comparative cost basis.

A substantial degree of technical substitution appears to be possible in the baking, canning, and dairy industries; and, in each of these industries, the sucrose share of total caloric sweetener use has generally declined in recent years (23, p. 1363). The widening gulf between sugar

and corn sweetener prices and better consumer acceptance for corn sweeteners might alter or even change the trends in the beverage and confection industry which have continued to be favorable to sucrose.

Sugar producers are also concerned about a new development; recently "researchers announced that they had perfected an enzyme which converts dextrose to levulose. The significance is this: dextrose the sweetener in corn syrup is not nearly so sweet as sucrose, while levulose is much sweeter." (65, p. 7)

Given time to develop the economics of this process the corn sweetener industry might be able to develop a syrup quite similar to high conversion liquid sugar, a product which contains about equal shares of dextrose and levulose, with a very small proportion of uncoverted sucrose. The added sweetness of such a mixture and the ease of its handling as a liquid would eliminate most of the favorable advantage attributed to sucrose in the industrial market. At any rate, it would appear that corn sweeteners will become more freely substitutable for sucrose than in the past (65, p. 7).

According to a recent study, "the rapid increase in the consumption of non-caloric sweeteners, particularly cyclamate in the early sixties, has added a significant new dimension to the market for sweeteners." (3, p. 3) Prior to this time it was assumed that foods and beverages sweetened with non-caloric sweeteners were for people who could not use sugar.

Today the "weight-consciousness" of the public has allowed for substitution of non-caloric sweeteners for sugar in a number of uses. The most effective use of the artificial sweetening agents has been made in the soft drink area.

The role of non-nutritive sweeteners can be expected to increase in the future, but not all of that increase will be at the expense of sugar,

since these artificial sweetening agents appear to have certainly cultivated a "new dimension" in the consumption of sweeteners. It now appears that less than one-third of the growing consumption of non-nutritive sweeteners represents direct substitution for sugar (65, p. 8). The remainder appears to be new demand.

If the Food and Drug Administration restrictions on synthetic sweetener mixes were eliminated (synthetic sweeteners have not been deemed acceptable for the FDA for food products), the competition between synthetic and caloric sweeteners would increase substantially, although such a change would be difficult under the non-food definition currently applied to non-caloric sweeteners (23, p. 1364).

Corn sweeteners would also benefit from such changes since it is probable that corn syrup sweetened with a synthetic additive would be highly competitive with sugar in sweeteness and well below sucrose in price.

Substitution for sugar is not only limited by technology, but also legally, as indicated by the special labeling and limited use restrictions placed on non-nutritive sweeteners. The use of corn sweeteners is also regulated in the canning industry by the Food and Drug Administration's standards of identity for major canned fruit products by limiting the percentage of corn sweeteners which can be used in canned fruit. Many canners have not reached the legal maximum for corn sweeteners allowable according to sweetener content (23, p. 1363).

Recent action by the Food and Drug Administration has imposed even more stringent controls on non-nutritive sweeteners. All products containing cyclamates were recently taken off the market by the FDA as a result of continuing research on the affects of non-nutritive sweeteners on the body.

Competitive sweeteners are almost completely ignored in current sugar legislation, but it is possible that in the future some form of control will be called for and enacted to regulate the entire sweetener market.

Tastes and Preferences

When a consumer makes a choice between a low-calorie and a sugar sweetened beverage, decides whether to put sugar in his coffee, or prefers fresh fruit over canned fruit, he is making decisions that will influence his consumption of sugar. The impact of these decisions on over-all consumption is cushioned by the great number of alternative uses and applications for sucrose with which an individual is confronted on a day-to-day basis. Still, consumer tastes, reflected in these simple preferences, will over a year's time, call up a certain level of sugar consumption.

Tastes may be traced further to family units, communities, geographic areas, and of course, to our nation as a whole. Any shifts or changes in individual or collective tastes will register in immediate change in per capita sugar consumption.

Because of changing inventory levels and other factors, the influence of taste on these year-to-year fluctuations is difficult to measure in quantitative figures; but it can be noted here that a trend toward lighter, low-calorie foods, which is being fostered by a calorie conscious public, and increased emphasis on dental hygiene could very well be responsible for a good portion of the downward variations, especially in areas where food "fads" have a very powerful influence.

Consumers in the United States are free to seek their own level of sugar consumption because of the low opportunity cost for sugar in this country. With this in mind, it is interesting to note that the United

States falls well below a number of other nations in per capita sugar consumption--a situation which can best be described by the differences that are found in the tastes and preferences of the consumers in this country.

Habits also have a bearing on the demand for sugar. One habit, for example, the chewing of gum, would seem of little consequence, until it is pointed out that in an average year (1958), 1.5 per capita pounds of sugar consumption could be directly attributed to this habit (58, p. 2). Other habits, such as eating candy or serving rich desserts, and the consumption of sugar-containing products connected with outdoor recreation, also influence the level of sugar consumption.

Habits like the tastes of consumers are subject to changes over periods of time, and it can be expected that any substantial change in the eating habits of U. S. consumers will be reflected in the consumption and demand for sucrose.

Income

In many parts of the world, the most important demand determinant for sugar is income, and the response of sugar consumption to changes in income appear to be greater than for all other foods except canned milk for infants (17, p. 11). This is not true in the United States, however, where changes in income have not been a significant factor in accounting for the small year-to-year fluctuations in per capita sugar consumption (70, p. 42).

According to a recent study by the Food and Agriculture Organization of the United Nations, demand is no longer a significant demand determinant. The limited influence of changes in income may be partially explained in the high income level enjoyed by U. S. consumers and in local factors

(such as tastes and preferences of various income groups) (17, p. 41).

High income levels also seem to promote increased consumption of animal proteins and protective foods such as fresh fruits and vegetables, which tend to substitute for some sugar consumption. A trend toward lower per capita sugar consumption was therefore noted in the FAO study at high per capita incomes. This trend may have gained momentum in recent years through anti-obesity and dental hygiene campaigns (17, p. 41). It would appear that sugar may become an inferior product in some applications for the very wealthy.

Declining per capita sugar consumption in the most developed areas of the United States has been off-set by increased consumption in areas where income is growing (notably the South). Changes in income are therefore, very useful in helping to explain the changes in geographic distribution of sugar (60).

On the household level sugar consumption in the United States was observed to increase as per capita income advanced from 200 dollars to 750 dollars, but consumption decreased by 10 per cent as income rose from 750 dollars to 1,250 dollars, and then fell off an additional 6 per cent at the highest income level[1] (17, p. 42).

The differences in per capita sugar consumption promoted by income differentials are not as great as might be expected. This observation lends strength to the argument that suitable substitutes are not available for many of sugar's basic uses regardless of income.

Income does appear to have an absolute relationship to how sugar will be consumed. The higher the per capita income, the greater the consumption

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[1]The FAO study used deflated real per capita income.

of sugar in packaged and convenience foods. Higher incomes usually increase the consumption at the institutional level as well by stepping up the demand for restaurants, hotels, ice cream parlors, etc.

Price

The price of sugar in the United States is not a significant factor in explaining the normal short-run fluctuations in the quantity of sugar desired by U. S. consumers. The price elasticity of sugar demand according to a 1962 FAO study was so small that it was no longer a significant variable.

Convincing evidence of this rather inelastic price response was presented during the abnormal sugar market of 1963 and 1964. While sugar prices exploded well above their normal or expected levels, per capita sugar consumption made only a limited response to the price changes. (See figures on per capita consumption and sugar prices)

In the long run the price elasticity of the demand for sugar is probably significantly greater than in the short run. At high prices, industrial substitution and lower household demand would cut into the sugar market, given time to alter technology and buying habits. At lower prices reverse substitution (sugar for corn sweeteners or synthetics) would occur, non-food uses for sugar would expand, and some increase in sugar consumption could be expected on the household level.

Sustained periods of high prices could have some of the same effects that sugar shortages and rationing had during World War II when there was a structural change in sugar consumption because industrial users and households were either forced to use quantities of sugar substitutes or to do without (17, p. 41).

Expectations

The portion of the United States sugar supply which must travel long distances over water is especially vulnerable to delay or loss during periods of international crisis. The public's experience with sugar shortages or rationing during such periods results in rapid demand shifts which create volatility in sugar prices and promote speculation and hoarding.

Sugar prices and inventories were sharply influenced during the Korean conflict and the Suez and Hungarian problems of the 1950's. In 1963, as news of real and impending sugar shortages fed market expectations, housewives rushed to their supermarkets, creating a near panic situation. In Atlanta, for example, the price of sugar was driven up from 57 cents per five-pound bag to 79 cents in a few short months. In other areas, prices were pushed to even higher levels and some consumers found local stores completely out of sugar (4 , p. 34).

The reaction of the non-industrial market to their sugar expectations is often wild and swift, but the market situation can be returned to normal almost as quickly as the trouble is abated and the public calms down.

In the industrial market, hoarding and speculation are also common during periods of supply problems. The reaction of industrial consumers can have some incidence, however, since it may act to encourage limited substitution. Some industries made such changes in 1963 when high prices and short sugar supplies were in clear evidence.

Impending strikes, shortages of production factors, or natural disasters, all are capable of influencing the expectations of sugar buyers and in so doing, altering the demand for sugar.

Expectations might also have a strong influence on sugar legislation

which is most concerned with the orderly operation of the sugar market. Any serious problems which promote unbalance in the flow of sucrose to the market-place will probably be met by corrective action under the Sugar Act of 1948, as amended.

Expected developments will also be immediately reflected in the purchase of raw sugar for inventory by the sugar refiners who are most vulnerable to changes in sugar prices.

The U. S. Supply Curve for Sugar

Fitting a curve to the supply of sugar available in the United States is not an easy task because of the complicated legislative controls which are imposed on sugar. It would be easy to construct such a curve if sugar were traded in a free market, and this is probably the most logical starting point for this analysis.

The long run free market supply curve for sugar would demonstrate the normal upward sloping tendencies of supply curves and would indicate the willingness of sugar producers to supply differing quantities of sugar at various prices. (See Figure 1)

The next step is to consider the changes in the supply curve which are dictated to sugar legislation. The first adjustment is to shift the supply curve to the left to indicate the effective exclusion of many potential suppliers through the quota system. The supply curve will now indicate the willingness of eligible suppliers to provide sugar to the U. S. market.

In Figure 2, the allocation of fixed quotas, on the basis of the consumption estimate of the Secretary of Agriculture, in essence locks out the upper portion of the supply curve in the short run (RS) by excluding potential sugar supplies beyond estimated sugar needs (RS' vs RS).

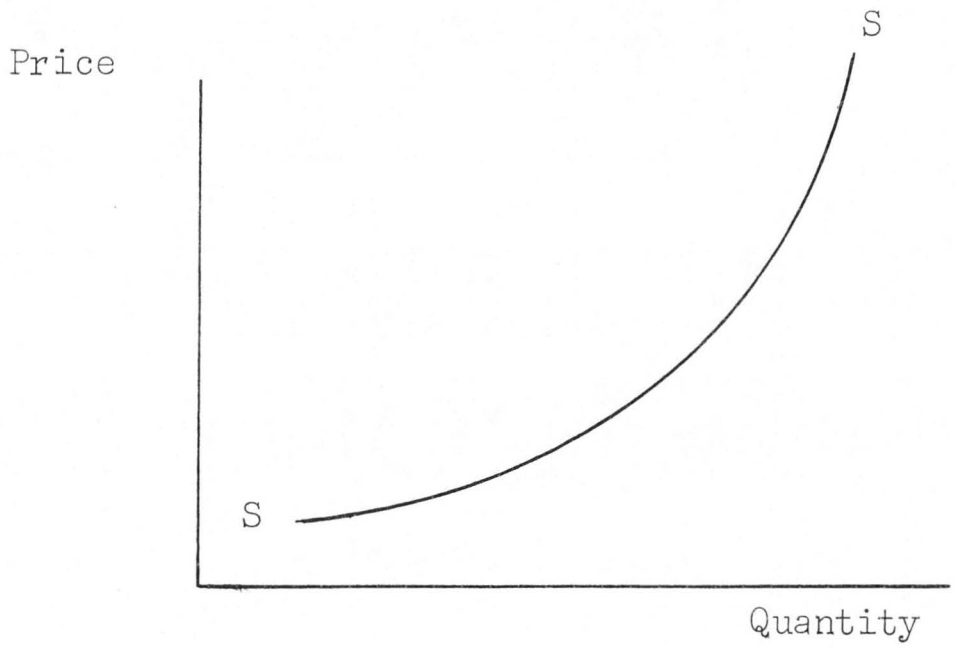

Figure 1. A composite short run supply curve for sugar in the United States.[a]

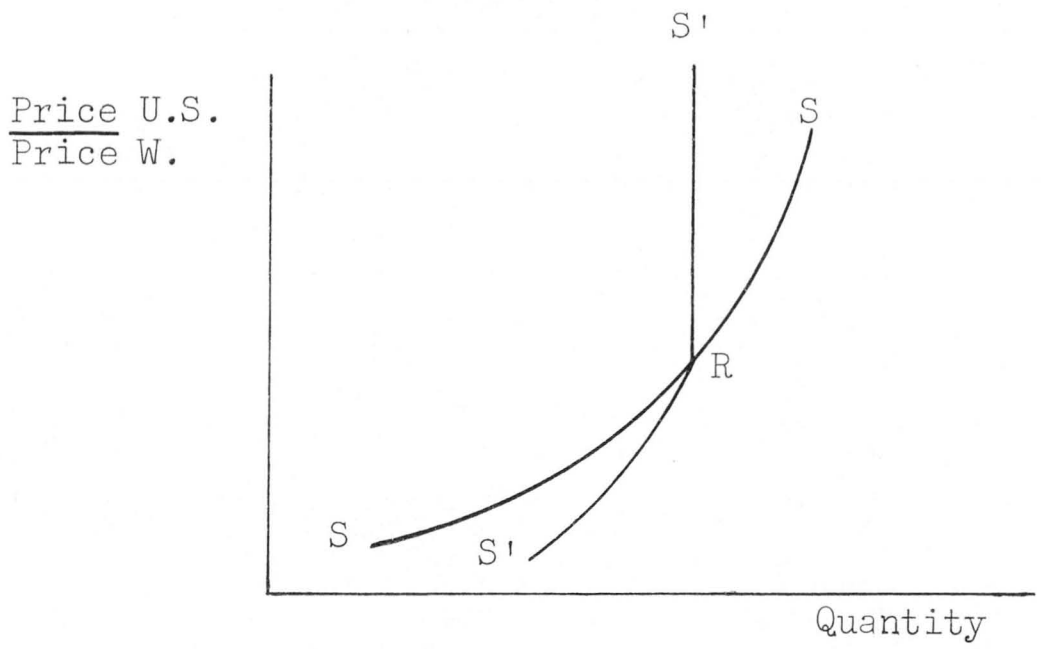

Figure 2. A comparison of composite short run supply and available short run supply.

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[a]The curve (SS) represents the composite short run supply curves of both U.S. and foreign suppliers.

The lower portion of the supply curve in Figure 2 is also altered by invoking legislative penalties on U. S. sugar producers who do not produce sugar every year or upon foreign suppliers that sell elsewhere when U. S. prices are not as attractive as world prices and in so doing fail to meet their quota obligations.[2]

Because U. S. prices are normally well above world prices, long-run profit considerations will cause supplies to the U. S. market to forego some immediate profits or alternative resource allocation to protect the long-run profit potential insured by a share in the U. S. sugar market. The short-run supply curve will, therefore, be more inelastic than the long-run supply curve (S'R vs SR).

If sugar prices in the U. S. are extremly low, less sugar would still be produced as limited cultivation would be practiced on existing crops and some marginal producers would be forced out of business. Also, if the long-run relationship between U. S. and world prices were to be altered for some reason the available supply of sugar and the degree of supplier loyalty could be expected to react accordingly.

The Secretary of Agriculture makes a consumption estimate (PE) and sets a target price (OP) for sugar. If the consumption estimate is accurate (if the quantity demanded is equal to PE) then the target price will be maintained and the market will be in equilibrium at E.

Any change in sugar demand (shift in DD) will be reflected in changing sugar prices. These price changes will be met by shifting the supply curve (S'S') along the axis PE' to maintain the target price. The sifting of the supply curve is accomplished by expanding or contracting sugar quotas on

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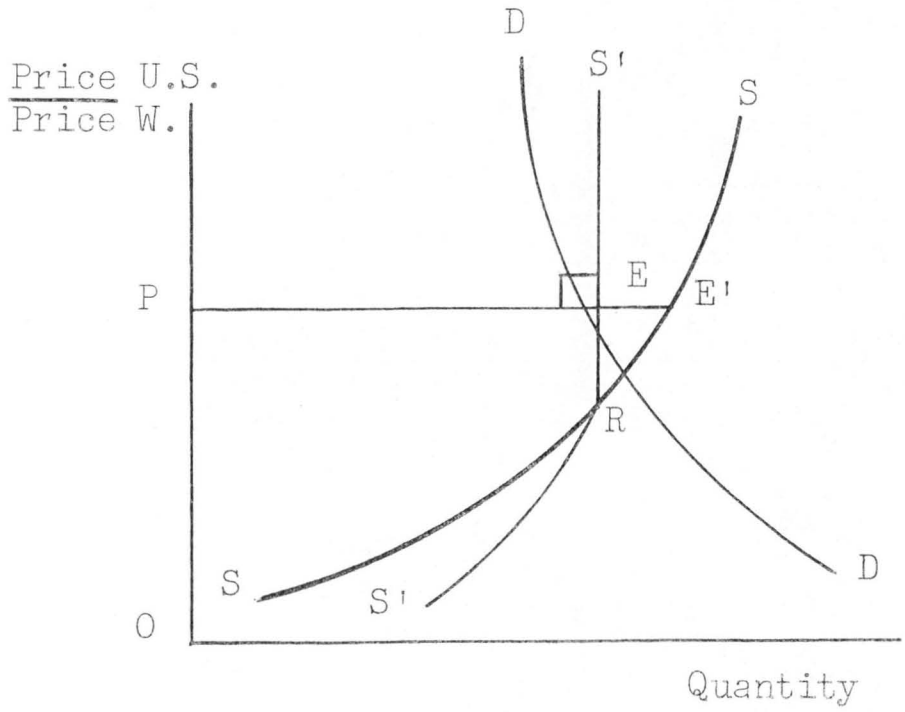
[2]These penalties are described in detail on page 33 and 34.



DD = demand curve
SS = composite short run supply curve
S'S' = actual short run supply curve
OP = target price
PE = consumption estimate

Figure 3. A demand curve and target price are added to Figure 2.[a]

a yearly basis to insure a smooth flow of sugar to the U. S. market.

If the changes in consumption are negative then no problem will be encountered in maintaining a target price. If consumption is increasing, however (DD shifting to the right), expansion from E to E' may be possible as surplus stocks are eaten up and current harvests are maximized.

If the supply curve shifted to the left, indicating a short supply of sugar, no reaction would be necessary unless the shift moved the supply curve (SS) beyond the point (E). In which case, the price of sugar would

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[a]Figure 3 assumes world prices to be fixed.

have to rise and most probably the sugar quotas would temporarily be dropped.

However, if demand shifts to the right beyond E' then there is no possibility of equilibrium at the current target price (OP). The price must, therefore, be shifted upward and the quota restrictions (S'R) eased to allow for adequate supplies to satisfy the additional demand.[3]

The new price (See Figure 4) (OP') will act to curtail some of the new demand and the additional quota allotements will be adequate to fill the rest.

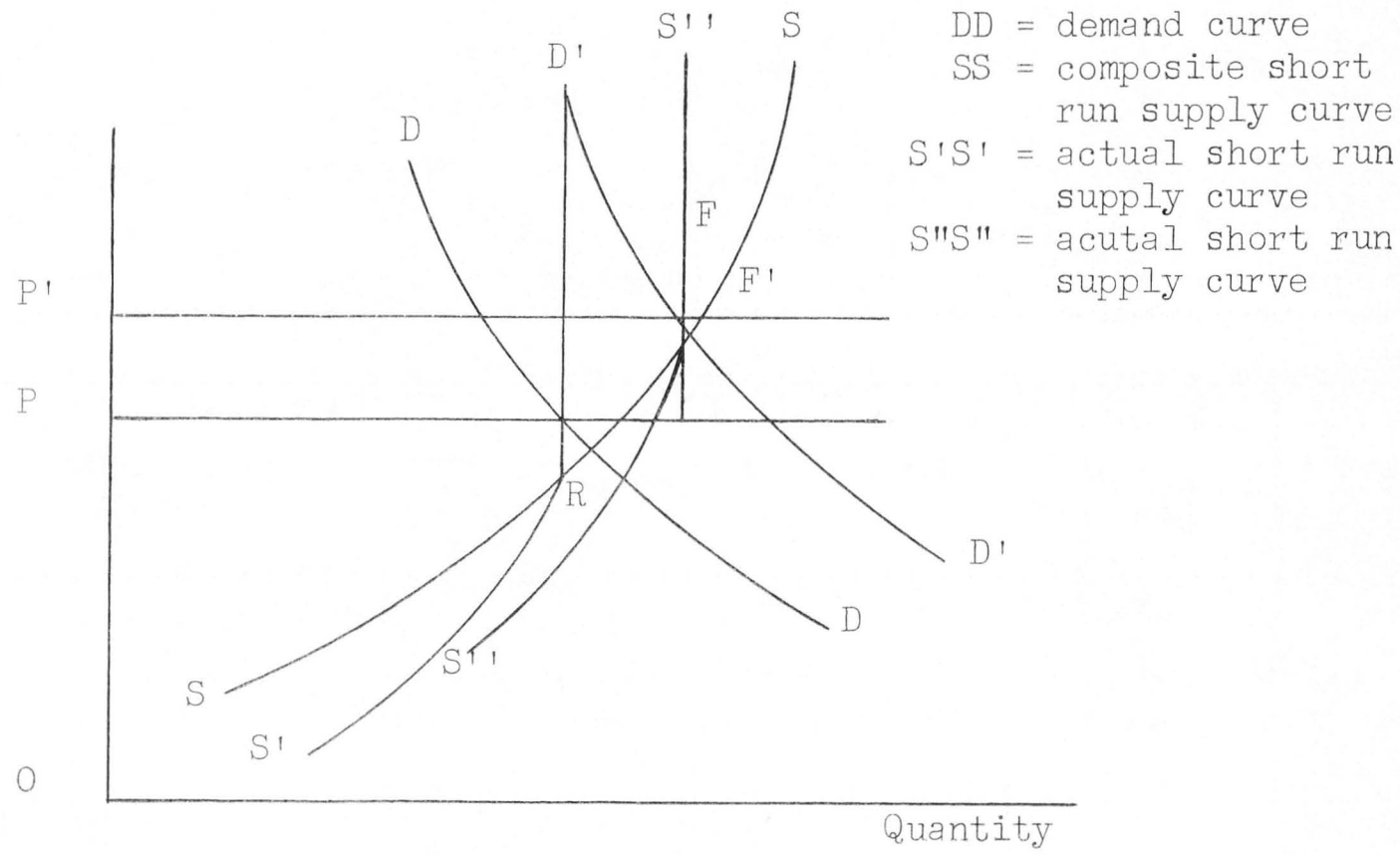

Figure 4. Supply and demand curves in a changing market.

[3]If the demand was great enough then the quotas might be recinded for a short period of time to allow for an expansion of the available supplies of sugar.

CHAPTER VII

SUGAR IN A TROUBLED MARKET

The Base Years--1953 to 1962

The sugar market in the United States was (in the decade prior to 1963) usually very stable, and it was characterized by a smooth and adequate flow of sugar supplies. Sugar prices for duty paid raw sugar at New York varied a maximum of only .85 cents per pound in any one year; and in most years the variation was much smaller. In 1962, for example, the price varied only .31 cents per pound (68, p. 144). This rather amazing record of price stability was caused, basically, by three factors.[1]

First, the effective operation of the Sugar Act of 1948, as amended, made it possible to shield the U. S. market from the problems of the world sugar market. Second, easy access to Cuban sugar supplies and surpluses which acted as a "buffer" between supply and demand in the U. S. market; and third, the fact that large quantities of sugar were available in the world sugar market throughout this particular period, as world consumption was well below world production.

The Sugar Act of 1948 stated that sugar could only enter the United States under an assigned quota (see History of Sugar Legislation, Appendix A.) Because the supply of sugar entering the United States was tightly regulated by such quotas, it was possible to maintain a balance between supply and

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[1]The price variations of sugar and nineteen other commodities traded in New York and Chicago are examined in Table 9, Appendix C.

demand, which is not possible in the world market.

Up until 1960, a small handful of sugar-producing countries, who were very jealous of their position in the U. S. sugar market, held nearly all the foreign quotas from the United States. The quota position was extremely meaningful to each of these countries, since it meant that they could sell their sugar at the much higher prices which normally prevailed in the U. S. sugar market. This was usually very profitable because the world price during this time span averaged anywhere from 1.5 to 3.0 cents per pound under the U. S. price (excluding the ten-month period following the Suez Crisis in 1956) (68, p. 144-145). Suppliers were, therefore, willing to make certain concessions to keep their preferential status in the United States sugar program.

When world sugar prices increased enough to be greater than U. S. sugar prices, the major sugar producers who were shipping to the United States were forced to ignore the quick profit potential on the world market. This kind of price cooperation provided a natural protective cushion for U. S. sugar prices on the rare occassions when world prices were extremely high. Consequently, while world sugar prices were affected drastically with the outbreak of the Suez Crisis and the Hungarian Revolution, U. S. prices remained relatively stable, because of the price cooperation of its suppliers, who cherished their respective positions in the United States sugar market.

Flucuations in the price of sugar were also controlled by quota manipulation during this period of time. If prices were increasing, additional quotas would be allocated and the price would be driven down by expanding sugar supplies.

In cases of falling sugar prices, the Secretary of Agriculture acted several times in the early and mid-1950's in an effort to cut the sugar

quota enough to bring prices back up by limiting the amount of sugar available.

The over-all availability of sugar also affects the stability of U. S. prices. Historically, the story of the world's sugar production is one of over-production which has resulted in an almost chronic accumulation of surplus sugar stocks. The years between 1952 and 1963 offer mute testimony to this statement as world production outstripped world consumption in every year of this decade.

From 1953 to 1962, the sugar market was a buyer's market, loaded with sugar, and the United States, as the largest buyer in that market, benefitted handsomely. No serious problems were encountered in the procurement of adequate sugar supplies for the U. S. market and the ease with which these supplies were attained helped stabilize sugar prices in the United States.

Cuban sugar filled about one-third of our normal needs prior to 1960, and more importantly, Cuba acted as this country's personal sugar storehouse. Reserve supplies were always set aside in Cuba and were available on short notice by simply making the necessary quota adjustments or allocations.

Cuba, therefore, acted as a buffer between the quantities of sugar supplied and demand in the United States--expanding and contracting sugar shipments at the request of the Department of Agriculture. The result of this fortunate partnership, added further stability to sugar prices and an equally important psychological assurance which helped play down any potential speculation in sugar.

While all these factors added up to make the United States sugar market very stable, some unusual flucuations occurred in the world market.

From 1953 through late 1956, prices in the world market remained

relatively constant, but with the Suez Crisis and the Hungarian Revolution coming to a head, sugar prices reacted sharply. In a little over six months the price of sugar climbed well above the United States price and then, as the trouble subsided, fell back near its starting point of a little more than a year earlier.[2]

The main reason for this sharp rise was the sudden closing of the Suez Canal, which affected transportation drastically. Because of this, consuming nations were forced to pay more money for whatever sugar was available. One reason the United States could ignore the Suez Crisis, was that our shipping lanes for sugar were not disrupted and, therefore, our supply was not challeneged.

The Hungarian Revolution at this same period of time, created havoc in Western Europe which is one of the prime sugar-supply areas in the world, further upsetting the supply picture in the world market.

After the world crisis period passed, world sugar prices resumed a much less dramatic course, once again falling well below U. S. prices, but still moving freely within a limited range.

The short run supply and demand curves for the U. S. sugar market during the 10-year period prior to 1963, but before the loss of Cuba as a major supplier to the U. S. market, are illustrated in Figure 5. The supply curve demonstrates a very flat trajectory through the lower portion of the curve due to the amazing ability of Cuban suppliers to expand or contract their production almost at will. The supply curve breaks sharply upward and to the right as demand reaches a large enough quantity that Cuba would be unable to make the adjustments. At this point the United

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[2]The world price for raw sugar jumped from 3.24 cents per pound in September of 1956 to 6.46 cents in April of 1957, and then fell back to 3.63 cents per pound by November of that same year (68, p. 145).

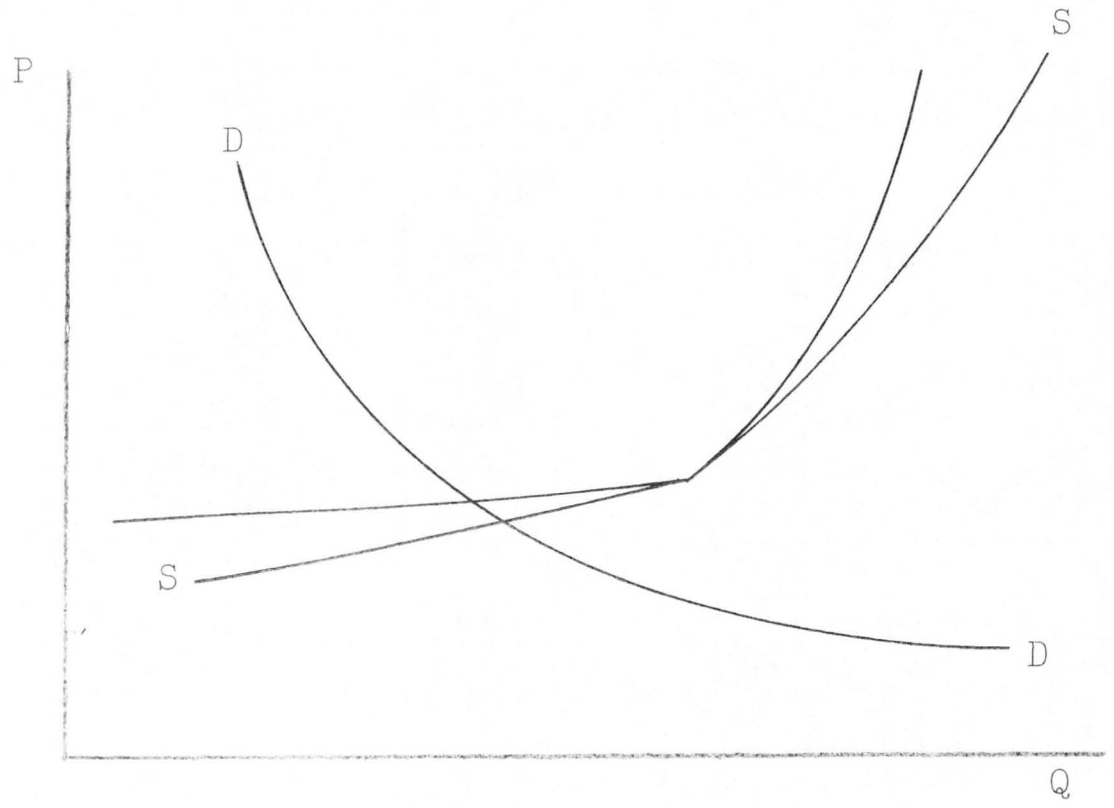

Figure 5. Typical short run supply and demand curves for the United States prior to 1960.

States would have to rely on sugar supplies which would be available on short notice in the world market.

After the loss of Cuban supply in 1960, and the adoption of the global quota system, the United States was forced into competition with other buyers in the world market. The change in the supply curve can be illustrated in Figure 6. Note the normal shape of the short run supply curve which illustrates the degree of difficulty met in obtaining large quantities of sugar in what is actually a very thing world market.

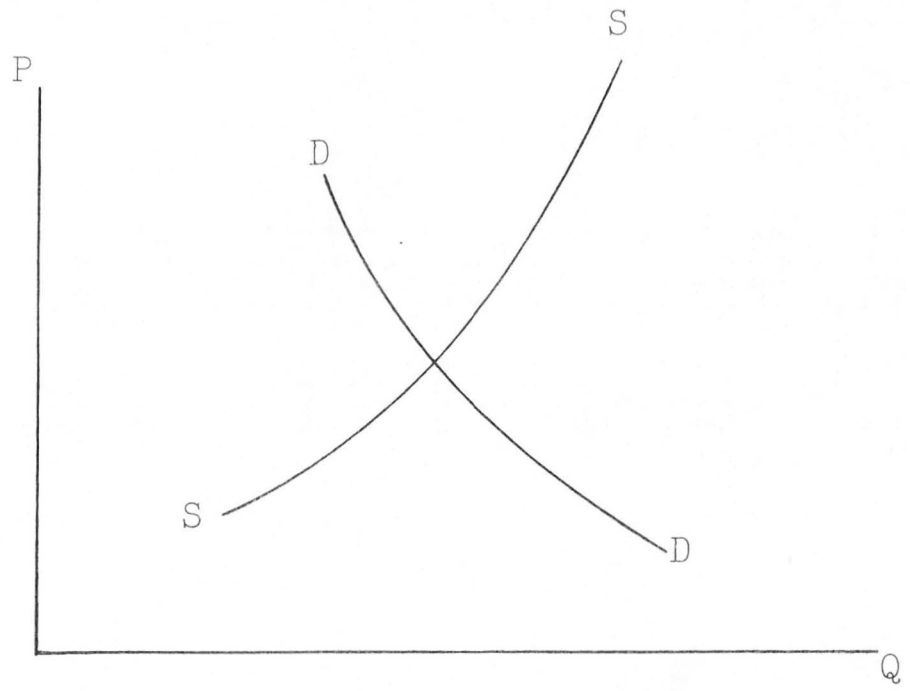

Figure 6. Typical short run supply and demand curves for the United States 1961 to 1965.

A Changing Market

Many of the factors which precipitated the abnormal sugar market of 1963 to 1964 actually had their beginnings several years prior to that time. During the early sixties, there were a number of very important changes taking place in the sugar market. These changes fell roughly into three basic groups: legislative, statistical and structural.

The most important development, and one which especially affected the U. S. sugar market, was the change in sugar legislation. The Sugar Act was written to allow for the replacement of the large Cuban supply which had been lost in 1960. The new sugar law brought the United States into the world sugar market for the first time in almost 30 years. It

replaced the specific quotas of the old law with a global quota theory, and also added a premium recapture clause, which virtually eliminated the premium which had been paid to sugar suppliers dealing with the United States.[3]

U. S. sugar prices were now firmly attached to world prices, at least until the U. S. demand was satisfied. Sugar suppliers no longer felt any obligation to maintain their position in the U. S. market, because the U. S. price was now almost identical to the world price. Therefore, the old loyalties which had once protected and buffered the U. S. sugar supply were now destroyed, and buyers from the United States became merely customers in the world market.

At almost the same time the U. S. was entering into the world sugar market for the first time, the statistical situation of that market was taking on a new look.

Because of the record sugar crop of 1960 to 1961 there was little indication that any major change from the surplus sugar situation of the fifties was in sight. But, suddenly, in 1961 and 1962, a change did take place, and for the first time in recorded sugar history, sugar consumption was greater than productivity for two consecutive years. In those two years, consumption outran production by nearly 5,700,000 short tons of sugar (See Table 1, Appendix C).

The physical decline in sugar production can be traced to problems in two major sugar producing areas: Europe and Cuba. These two areas normally provided about one-third of the world's sugar supply and Cuba alone was the source of about one-third of the world's freely traded

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[3]See The History of Sugar Legislation, Appendix A.

or exportable sugar.

The European beet crop was hit hard by poor growing conditions. Instead of producing about 15,800,000 tons of sugar as had been produced in 1960 and 1961, production fell to 13,000,000 tons in 1961 and 1962 and to just above 12,300,000 tons in 1962 and 1963 (27, p. 2).

In Cuba, at the same time, Castro's government was emphasizing industrialization and diversification, and the sugar crop was suffering from bad weather, poor management, and a shortage of spare parts, machinery, and fertilizers, which had normally been supplied by the United States. These combinations of problems reduced Cuba's sugar output from 7,459,000 tons of 1960 and 1961 to 5,308,000 tons in 1961 and 1962, and to an unbelievably low 4,211,000 tons in 1962 and 1963 (22, p. 55).

The gap between production and consumption during this period of time was widened even further by the continued growth of sugar consumption on the world level. Expanding sugar demand has been estimated at 5 per cent per annum by an FAO study in the early sixties and at 4 per cent by a similar Congressional study in the United States (17, p. 47). This continued growth was attributed to expanding population and increased per capita consumption, especially in the developing areas of the world.

During this period of transition, the market structure of both the U. S. and world markets was also being altered. The basic change, of course,was the loss of Cuba, not only as the major U. S. supplier, but as a major supplier to the world market as well.

Since 1961, for example, well over three-fourths of Cuba's sugar has been shipped directly to the Sino-Soviet block, and although some sugar was re-exported, the amount of Cuba's sugar which reached the world market, even as early as 1961, was only about half of that which was normally exported from that small island supplier (71, p. 4).

At this same time, the International Sugar Agreement was virtually abandoned because of the problems with Cuba (the world's largest sugar producer). It has been suggested that a strong international agreement may have helped to ease the problems of the early sixties. Although there may be some truth in this line of reasoning, it is doubtful that any agreement could have improved the growing conditions in Europe, or would have much real influence on the course of Castro's government in Cuba. The disappearance of large quantities of Cuban sugar from the world market meant more than just the loss of a large supplier, because the tremendous stabilizing influence once exerted by Cuba's variable productivity was no longer available to the United States or to the world market. Unfortunately, there was no other supplier large enough to take over the balancing function that had been exercised by Cuba.

As world sugar production fell below consumption needs in 1962, these needs were satisfied by drawing on the world surplus stocks of sugar. Apparently little notice was paid to these early draws on bulging sugar stores. No doubt sugar consumers expected the deficit to be quickly replaced to another bumper crop of sugar. However, the sugar crop of 1962 and 1963 was well below expectations, and the consumption deficit for the two-year period was expanded to nearly 5,700,000 short tons.

The Wild Sugar Market of 1963 and 1964

"We are witnessing sugar history." (4, p. 209) In these words, Julio Lobo, one of the giants of the sugar industry described the chaotic beginnings, in 1963, of one of the most unusual chapters in sugar history--the wildest in 40 years.

Many of the factors influencing sugar prices at this time had been developing prior to 1963, in fact, almost immediately after the signing

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of the new United States Sugar Act, in July of 1962, sugar prices began rising in the world market. These early price increases were apparently stimulated by a dual concern. First, that the new global quota system would have a significant effect on the demand factor in the world market; and, second, that the new legislation offered less incentive for over-production, since there was now no premium paid to sugar producers selling to the United States (34, p. 37).

As the summer of 1962 progressed, distressing reports began to appear regarding the European beet crop, which was suffering because of bad weather and a late growing season. The U. S. Department of Agriculture, apparently worried by signs of trouble in the world market, removed all controls on the 1963 beet crop in August of 1962 (68, p. 111), and at the same time, all deficits on quotas were re-allocated, quotas themselves increased, and the open quota balances were thereby sharply reduced (68, p. 112-113). In an apparent response to these actions, the world price for sugar was stabilized at about 3.18 cents per pound in September of 1962 (68, p. 145).

Although world prices were climbing gradually throughout the last half of 1962, apparently the full realization of the changes which had taken place in the sugar market were not appreciated until late that year. During October, for instance, France was selling sugar to West Germany at a reduced price, to be used as livestock feed (71, p. 114). Other countries, however, apparently did realize the seriousness of the situation, and prepared to conserve their sugar stocks: Bulgaria, Poland, East Germany, Czechoslovakia, for example, all of whom had been selling sugar at distressed prices, suddenly withdrew from the world market in late September (34, p. 38).

fee (34, p. 39). The response by the sugar suppliers was immediate and the remaining portion of the 750,000 short tons which had been allocated to the global quota earlier were fully subscribed, and an additional 350,000 short tons, which were released on January 31, were also immediately allocated (68, p. 115).

The early allocation of some two-thirds of the year's total allocation gave some strength to price stability in the United States. At the same time, however, prices in the world market were pushed even higher.

By February 26, the Department of Agriculture announced a re-allocation of deficits of some 231,000 short tons, and a release of an additional 200,000 short tons of the global quota. (Only 200,000 tons of the original 1,500,000 ton allocation on the global quota was unallocated as of this time (68, p. 115). Immediately following this announcement, the world spot price jumped 15 points to 6.21 cents per pound, and the world's future price rose 50 to 80 points (34, p. 41). Two days later, the Department of Agriculture announced that the quotas had been fully subscribed.

The action of the United States Department of Agriculture again caused the U. S. prices to lag behind the rapidly increasing sugar prices on the world market, however, U. S. sugar prices still continued to climb rapidly during March of 1963.

On April 5, the Department of Agriculture released the remaining 200,000 tons of global quota, and by April 24, the quota had been entirely allocated (68, p. 115). At this same time, consideration was given to securing committments from the various countries under the country quotas who committed to delivery times less than 40 per cent of their various quotas. The Department announced that consideration was being given

to various methods of encouraging the speeding up of the offerings.[5]

The Department of Agriculture announced on May 6, that the total consumption quota was being increased by 600,000 short tons to 10,400,000 short tons. In addition, the deficit on the sugar quota was re-allocated and 221,000 short tons added to the global quota (68, p. 115).

As the United States went back into the world market for these additional quantities of sugar, the price of sugar jumped 170 points within one week, and 300 points in a two-week span. Both the U. S. price and the world price moved in tandem during this period (34, p. 42).

The price of sugar reached its peak on May 23, when world prices had reached 12.6 cents per pound and U. S. prices were at 13.2 cents. The Department of Agriculture then announced that adequate supplies of sugar were available to fill the global quotas and that additional assurances had been received from foreign countries holding country quotas. These assurances were made on quantity with no reference to price. However, the quantities so committed, when added to all other available supplies, equalled about one-half million tons more than the expected U. S. consumption requirement for the remainder of the year.[6]

The announcements by the United States Department of Agriculture caused an immediate break in world and U. S. prices. Unlike the preceding period when world prices had led U. S. prices upward, during this period of time, it was the U. S. price leading the world price downward. At this same time, the fears for an immediate sugar shortage in the world were being lessened as the prospects for an adequate sugar

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[5]The country quotas which are discussed here technically could be filled at any time during the year.

[6]This 500,000 tons of sugar was probably being held at this time as added inventory by the sugar users.

crop for the year 1963-64 seemed to be increasing.

During the late summer of 1963, however, reports from Europe indicated that the 1963-64 beet crop would show little improvement over the two previous crops. At the same time, in Cuba, hurricane Flora had apparently wrecked any possibility of an increase in the Cuban production.

In September, the realization that the situation would not improve, suddenly stirred a reversal in the sugar prices on the world market, and world prices again led U. S. prices upward during the latter part of 1963.

From an average price of 6.63 cents per pound in August, the world price shot up to a high of 11.63 cents in November of 1963. This price increase was stirred by continued reports of poor production in Europe and an extremely poor crop in Cuba.

The U. S. price for sugar jumped from 6.65 cents per pound in August to 7.45 cents in September and on up to 9.42 cents in October of 1963 (68, p. 144-145). At this point, the U. S. price no longer followed the skyrocketing world price because the total U. S. requirement for sugar was assured along with an excess of approximately 500,000 tons which apparently was being held in inventory.

On October 22, 40,000 tons of Hawaiian quota deficit was allocated to the Philippines (68, p. 115), and with the sugar requirements for the United States apparently more than filled, the price on the U. S. market fell off in both November and December of 1963. The world price continued to climb to a high in November of 11.63 cents per pound, and then dropped rapidly in December to a price of 10.36 cents (68, p. 115).

On December 18, the Secretary of Agriculture, Orville Freeman, determined that the sugar requirements for the year 1964 would be 9.8 million tons. No import fee was to be charged on any sugar imports, as long as the world price exceeded the domestic price.

On December 26, the United States Department of Agriculture announced that approximately 745,000 tons of the 1,000,000 tons authorized for purchase under the global quota had been subscribed, and approximately 53 per cent of that sugar was scheduled to arrive in the United States during the first seven months of 1964. Supplying countries had been notified earlier that early delivery or committment of raw sugar to the United States for 1964 would have a strong bearing on the administration's recommendations to Congress with respect to the allocation of country quotas after 1964. The same countries were asked to indicate the quantity and appropriate schedule of their shipments to this country. In a way this was the use, again, of the coersive blackmail power of the quota system.

As the United States once more entered aggressively into the world market, world and U. S. prices shot up briefly during January of 1964. The forecasts during this period for the 1963-64 crop indicated a very substantial improvement over both of the two prior crops. This indication of the improved availability of sugar combined with the rapid allocation of U. S. quotas started world prices tumbling again from a high in January of 1963 of 10.64 cents per pound, to a low in December of 2.76 cents (68 p. 145). This rather amazing decline was accentuated by continued reports on a healthy sugar crop for 1963-64 and, of course, by indications that new sugar legislation would soon be written to remove, in effect, the United States from the world sugar market.

As the world price of sugar dropped continually during the latter half of 1964, and fell once again to the depressed prices which had been registered during the fifties and the early sixties and the U. S. price returned to its normal and rather stable level, a unique chapter in sugar history was brought to a close.

Sugar Prices in the U. S. Market: 1963-64

The sudden price explosion in the U. S. sugar market during 1963 and 1964 made a shambles of what had been a remarkable record for price stability. As the sugar market returned to the calm that had existed prior to 1963 and 1964, it was possible to examine some of the factors which had caused this unusual market behavior. One of the important developments during the period under question was, of course, the changes in the supply of sugar available to the U. S. market, and also the changes which had been made in sugar legislation which altered the method by which the sugar supplies would be obtained.

World sugar production fell off during 1962 and 1963. Smaller quantities of sugar became available, not only to the U. S. sugar buyers, but also to other sugar buyers throughout the world, who relied on world market sugar to fill their needs. The poor beet crops in Europe and the diminished production of Castro's Cuba during this period had a very strong influence on this supply situation, as did the shipping of the majority of Cuban Sugar into the Sino-Soviet block, thereby effectively removing much of it from world trade patterns.

Sugar production in some domestic areas was also adversely affected during this period. The domestic beet industry, for example, had quota deficits for 1962 and 1963 of more than 500,000 tons of sugar. The mainland cane industry in 1962 was well over 200,000 tons short of its quota. Hawaii and Puerto Rico also failed to fill their assigned quota allocations, and in Puerto Rico, the shortage was nearly 500,000 tons of sugar (68, p. 131).

To further complicate matters, the new sugar legislation which had been written in 1962 had eliminated the supplier loyalties, which had heretofore protected the U. S. market. Under the global quotas, which were to be

filled on a first come, first serve basis, no provisions had been made to allow for a world price which exceeded the price of sugar in the U. S., under which circumstances, obviously, sugar would not flow to the United States. The value of the country quotas was also diminished by the "premium recapture" part of the law, which eliminated the difference between U. S. prices and world prices (see section on History of Sugar Legislation in Appendix A).

As the price of sugar climbed in both the world and U. S. market during early 1963, foreign sugar suppliers were reluctant to ship sugar to the United States under either type of quota. They preferred rather to take advantage of the high prices currently being paid on the world market, earmarking, in many cases, later production for shipment to the U. S. market. This reluctance on the part of many of our sugar suppliers placed an added burden on the supply situation as it existed in the United States because it meant that sugar would be in short supply during the first half of 1963.

Therefore, not only was sugar in short supply in both the world and U. S. markets, because of lower production, but at the same time, the sugar that was available was not readily obtainable for U. S. consumption. These factors combined to substantially alter the short run supply curve for the U. S. market, affecting not only the price at which sugar would become available, but also the quantities of sugar that would be available at any given price.

During this same period of time, the demand for sugar was also undergoing some very substantial changes. The continued growth of the population in the United States added its particular pressure to the demand for sugar, but the real changes that were to take place were caused by the panicky buying and hoarding of sugar.

During the periods of relative calm which had preceded the wild sugar market of 1963 and 1964, the users of sugar had become accustomed to plentiful supplies of sugar at relatively constant and moderate prices. Inventory practices, therefore, had been adjusted to take advantage of this smooth flow of sugar into the marketplace.

As sugar prices began to skyrocket, sugar buyers were forced to readjust their thinking with regard to their particular sugar needs.

Many sugar buyers reacted violently. In Atlanta, the price for a 5 pound bag of sugar jumped to 79 cents in May of 1963 up from 57 cents in January. A Chicago chain reported sales three or four times normal volume. In Stamford, Connecticut, housewives in some grocery stores found no sugar on the shelves. In Lake Charles, Louisiana, sugar ran up as high as 90 cents for a 5-pound bag (4, p. 34).

The scare buying of sugar during this period resembled in many ways the panicky buying which took place at the outbreak of the Korean War. Industrial sugar users also were forced to re-evaluate their inventory practices and many industrial users jumped into the sugar market immediately to add to their relatively thin stores of sugar.[7] The short run demand curve for sugar during the early part of 1963 was again altered substantially, as buyers rushed into the market to purchase additional quantities of sugar above their current needs.

The presence of so many eager sugar buyers and so few and such reluctant sugar sellers set the stage for an extremely bullish sugar market.

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[7]Many industrial consumers of bulk and liquid sugar who could not handle additional inventories because of a lack of special facilities were forced to turn to the futures market to insure adequate inventory levels.

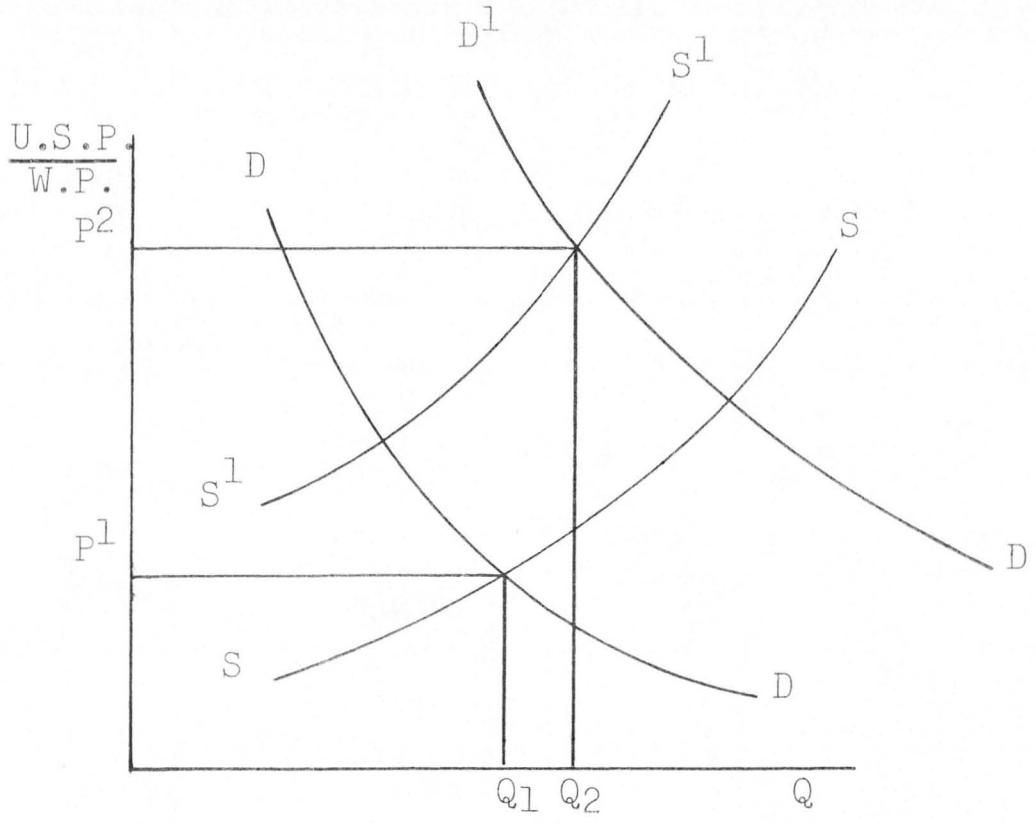

Figure 7. Short run supply and demand curves as they shifted during 1963.

The short term supply and demand curves for world market sugar during the early part of 1963 were going through some rather frantic changes. The initial shortages of uncommitted sugar generated by the poor crop of 1962-63 had initiated an upward shift in the supply curve (SS to S'S') which was multiplied by the reluctance of some suppliers to market their sugar.

The demand curve was being altered simultaneously (DD to D'D') by the extremely aggressive pruchasing policies of the United States Department of Agriculture, as the U.S.D.A. attempted to obtain committments on enough sugar to satisfy U. S. demands for all of 1963.

The drastic changes which had taken place in both the demand for and the supply of sugar for the U. S. market during this period of time were not soley responsible for the violent fluctuations in the price of sugar. Much of the responsibility must also be shared by the U. S. Department of Agriculture, which is responsible for the implementation

of U. S. sugar legislation and by speculators on the New York Coffee and Sugar Exchange, where future trading and speculation for the product sugar is carried on.

The rather violent search for large quantities of sugar carried on by the United States Department of Agriculture during the early part of 1963 added additional impetus to the already rising price of sugar. The situation was further aggravated by the increased demands placed on an already thin market, as the Department of Agriculture increased the consumption estimate of the United States on May 6, 1963 in an effort to satisfy additional U. S. demands (68, p. 115).

Many of the significant price changes which took place in the market during 1963-64 were stimulated by the announcements of the Department of Agriculture. The announcement on May 6, for example, that increased the consumption total and the import quota by some 600,000 short tons was followed by an immediate price increase within one week of some 170 points and a 300 point increase over a period of two weeks (34, p. 42).

The announcement on May 23, that adequate supplies had been obtained for the U. S. market sent sugar prices reeling downward for two weeks. This downward trend continued, but less rapidly, for the following four-month period. The Department of Agriculture has come under criticism from various sources for its activities in the early part of 1963 mostly because of its willingness to release the entire year's quota allocation in the first three months of that year, thereby forcing an almost unbearable burden on the already thin world market. There is no question that the activities of the United States Department of Agriculture contributed to violent price increases during this period, although additional demands for more sugar were caused by the hoarding and scare buying that was taking place in the U. S. which forced an even greater burden on the already

diminishing supplies of sugar in the world market.

The attitude of the USDA is reflected in the following statement by Tom Murphy of that department. "We have never before faced a situation when quickly available supplies of sugar were so scarce at a time when our sugar buyers were adding so massively to their stock. (61, p. 12)

It would be pointed out that the USDA was operating under a severe handicap during the wild market of 1963-64, because sugar legislation which had been passed in 1962 proved to be so woefully incapable of coping with market conditions when world prices exceeded U. S. prices.

The actions of the USDA in late 1963 proved to be much more effective than they had been roughly a year earlier. As conditions, similar to those which had triggered the initial price explosion in late 1962 began to appear in the fall of 1963, the USDA took quick action in an attempt to avoid the problems encountered earlier that year.

Indications were given to sugar supplying countries that their future sugar quotas, under new sugar legislation, which was expected to be written in 1965, would be strongly influenced by their willingness to supply the U. S. market during 1964. This action successfully prevented U. S. prices from following world prices to a peak well above the level which had been reached in May of 1963.[8]

When sugar prices finally broke on May 23, 1963, the House Subcommittee on Consumer Affairs was commissioned to study the factors behind the spectacular rises in sugar prices (34, Appendix II). Its report, which was published on August 5, 1963, concluded that speculation in sugar futures on the New York Coffee and Sugar Exchange contributed materially

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[8]In May of 1963 the U. S. price for sugar was 11.08 cents per pound while the world price was 10.36 cents. During the second price peak in November of 1963 world prices averaged 11.63 cents per pound while U. S. prices peaked at 9.34 cents per pound (68, p. 144-145)

to the sharp rise in sugar prices in the spring of 1963, and the subcommittee further commented that it was excessive speculation in futures, rather than manipulation, that stimulated the price advance and the subsequent price break. According to this report, of the 1,517 traders dealing in the number 8, or world, contract, more than 90 per cent were speculators. Most of these speculators appeared to be buyers and the effect of their activity contributed to the upward price acceleration of the world contract. The number 7, or domestic, contract, appeared to be used mainly as a hedge by large firms in the sugar industry, with the largest utilization by sugar refiners and hedging also by distributors and food and chain store organizations for their own protection (57, p. V-VI).

It should be pointed out in defense of the New York Coffee and Sugar Exchange that the very purpose of the exchange is to allow for speculative hedging against the marketing risks associated with actual distribution, storage, and processing of sugar. Trading in futures is expected to reflect the underlying changes in the marketing conditions of supply and demand (see Appendix B). Because of the conditions which existed in the sugar market during this period, speculation and heavy futures trading had to be expected. There is evidence, however, that activities on the New York Coffee and Sugar Exchange were responsible for some of the instability within the sugar market during 1963 and 1964.

In a privately financed study prepared as a rebuttal to the House Subcommittee on Consumer Affairs report, the statement was made that when a commodity, like sugar, had demonstrated rather stable prices over a long period of time that "such a market will not have an experienced group of outside speculators prepared to operate on long term expectations of price changes." (34, p. 26)

The sudden explosion of sugar prices in late 1962 created a vacuum within the sugar exchange that could not, therefore, be filled by experienced or, if you will, professional speculators. Instead the market drew a large number of small speculators. More than 42 per cent of the traders in the world futures during early 1963, held just one contract and over 80 per cent held less than 10 contracts (57, p. 15). Most of these speculators were drawn by stories of quick dollar profits and nearly all were buyers who were attracted by the upward trend in sugar prices.

According to the New York Coffee and Sugar Exchange study; the "charge of too much speculation would make sense if it were rephrased as too much speculation by trendists, and too little fundamental appraisal of the market." (34, p. 24)

Conclusions

1. The violent price fluctuations in the U. S. sugar market were primarily caused by the imbalance of work supply and demand.

2. The extent of the price variations in the U. S. was accentuated by the following factors:

   a. the inability of U. S. sugar legislation to shield the U. S. market from the instability of the world market;

   b. the highly aggressive pursuit of sugar supplies by the USDA during the early months of 1963 which further aggravated an already unbalanced supply-demand situation;

   c. excessive activity on the New York Coffee and Sugar Exchange by a non-professional group of buyers which further stimulated price instability;

d. scare-buying and hoarding by U. S. sugar consumers which forced the demand for additional quantities of sugar during the critical days of 1963.

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APPENDIXES

Appendix A

A Brief History of Sugar Legislation

Tariff for revenue 1789-1890

One of the first commodities to be regulated by the colonies after gaining their independence was the product sugar. In 1789 the Continental Congress, seeking a means of supporting the government, imposed a tariff on raw sugar to help raise revenue. During this period in American history, tariffs and duties were the major source of government income and sugar provided close to 20 per cent of these tariff revenues (9, p. 18), or an average of nearly 40 million dollars each year (50, p. 63). This duty, which averaged about 2.5 cents per pound, remained on sugar continuously until 1890 (9, p. 18).

Although the original purpose of the tariff of 1789 was to garner monies for the treasury, it also provided ideal protection for the Louisiana cane industry after that area became a U. S. territory in 1803. The Louisiana cane industry grew quickly to respectable size behind this protective tariff wall.

Tariff protection was extended to Hawaiian sugar through the Reciprocal Treaty of 1876. Under this treaty, Hawaiian sugar was given a duty-free status. The marketing advantage gained through this agreement and the natural cane growing conditions in the Islands allowed Hawaii to increase sugar production ten-fold in the first ten years under this agreement. By 1890 sugar production had become Hawaii's most important industry and an industry which was very dependent on market outlets in this country for its well being (11, p. 21-22).

The tariff for revenue served its purpose, bringing in many millions of dollars each year and also offering the bonus of protection for domestic producers.

The sugar bounty 1890-1894

In 1890, with a surplus in the treasury, Congress yielded to public clamor and put sugar on the free list by repealing the tariff of 1789. In so doing they lowered the cost of sugar to the consumers who had borne the incidence of the earlier duty; but they also eliminated the protection offered by the tariff, and domestic producers suffered (50, p. 64).

Consequently, Congress decided to replace the protection offered by the tariff of 1789, by placing a 2 cent bounty, or subsidy, on every pound of sugar produced in this country. The bounty did not cover Hawaii's sugar, and the Islands' sugar industry slumped badly and production fell off. The general unrest and strife which developed because of this situation led to the revolt against Queen Eilinokalani in 1893 and the establishment of the Republic of Hawaii in 1894 (11, p. 25).

Cuba, another supplier directly affected by this action, faced, for the first time, an unrestricted U. S. market, and sugar production boomed on the small island. This was the first real encouragement to this country which was later to become the chief sugar supplier for the U. S. sugar market.

Under the new legislation of 1890, the treasury not only lost nearly 50 million dollars which the sugar tariff had provided, but it also had to pay out nearly 10 million dollars per year in bounty payments (50, p. 64). This kind of subsidy program did not earn much congressional backing, except for the states where sugar cane or beets were being produced, and may explain in part the short longevity of the legislation.

Tariff for protection 1894-1934

In 1894 the bounty system was discontinued and a new tariff was levied on sucrose. The purpose of the tariff of 1894, unlike that of

the earlier tariff, was not to produce revenue, but rather to protect the domestic sugar industry which had grown to significant size under earlier tariff and bounty protection. The new tariff also returned Hawaiian sugar to the free trade status which it had enjoyed under the Treaty of Reciprocity of 1876 (9, p. 19).

During the time covered by the tariff for protection, the sugar industry enjoyed a period of stable earnings, a time of wild prosperity, a short but severe depression followed by a temporary recovery, and then a prolonged depression.

As a result of the Spanish American War the U. S. extended favorable market concessions to three former Spanish possessions which were sugar producers. These were Cuba and the newly acquired territories of Puerto Rico and the Philippines. Each of these countries was given preferential treatment in the U. S. sugar market during this period. Cuba also received a preferential price differential under the convention of Commercial Reciprocity of 1902. Puerto Rico received its free trade status in 1901 and the Philippines were aided gradually until they received free entry clearance in 1913 (11, p 30-31).

Under the protective wing of this country's sugar legislation, production expanded rapidly in both Puerto Rico and Cuba until they became, like Hawaii, single crop economies, leaning heavily on the protective nature of U. S. sugar legislation. The sugar industry also prospered in the Philippines.

The domestic beet industry grew rapidly under the new tariff, and by the time World War I came along, beet producers were supplying nearly one-fifth of the total U. S. sugar requirement. Domestic and insular sugar suppliers grew so strong under the tariff of 1894 that by 1913 all other foreign sugars were virtually pushed out of the U. S. market (11, p. 31).

This closed condition of the sugar market, under the protective tariffs, insured a stable and adequate flow of sugar, although the cost of sugar was substantially higher than it would have been under free trade. Later on, however, the flow of sugar was to become excessive and the problem of over-supply from the protected producing nations became a major concern.

Congress was in the process of putting sugar back on the free list when World War I came along and ended all debate (50, p. 68). Strict wartime controls were clamped on sugar traders and also on sucrose prices. Fixed prices were established and maintained during the war years, and, in addition, a price guarantee was placed on domestic beet and Cuban sugar. During the war years beet growers maintained their pre-war output at near the same level, while Cuba responded to the price guarantee with a tremendous increase in production.

As World War I came to a halt and price controls were relaxed, sugar became one of the price leaders in the spectacular post-war inflation of 1920. In May of that year the price of raw sugar reached a record peak of more than 23 cents per pound. The price bubble soon burst, however, and in less than twelve months prices had fallen below 5 cents per pound (50, p. 69). (See Figure 8)

The resulting depression of 1921 and 1922 was short-lived, and in late 1922 and early 1923 sugar prices were once again advancing. Sucrose prices remained rather stable during 1923, ranging between 5 and 6 cents per pound, and many people believed that the market had finally regained its pre-war stability (9, p. 20).

Unfortunately, this optimism contributed to the overwhelming sugar crop of 1925 which left the market buried under a heavy sugar surplus. Prices dropped below 1922 levels as sugar production increased in many countries where governments were artificially encouraging beet production.

Falling sugar prices were not successful in lowering production, because of the improving technology of the sugar industry and the planting of even more sugar-yielding crops in some areas in an effort to maximize profits.

The situation improved in 1927, but that short upturn in sugar prices was quickly followed by equalizing drops. In 1929 the price of sugar slumped even further and conditions did not improve until this country started to make its long recovery from the bottom of the depression cycle in 1932-33. (See Figure 8)

Domestic sugar producers suffered heavily during these periods of depression, and Congress acted on several occasions to try and insulate the domestic industry, first by increasing the Cuban tariff from 1 to 1.6 cents a pound in 1921, and then upward to 1.7648 cents in 1922. Other foreign duties were increased accordingly to allow Cuba the 20 per cent tariff differential which had been guaranteed under the Convention of Commercial Reciprocity in 1902 (4, p. 59).

The increased duties did act as a buffer in easing immediate price problems. In fact, during 1923 and 1924, consumers were complaining that the tariffs were forcing prices too high. As the depression hit bottom in the early thirties, the duty on Cuban sugar was increased again, this time to 2 cents a pound and the duty on foreign sugars was set at 2.5 cents (2, p. 21). Even these high import duties only partially offset the sagging level of world sugar prices and prices in the U. S. followed world prices down to a low of less than 3 cents per pound in 1932--just enough to cover the 2-cent Cuban duty and the freight over and above the world price. (See Figure 8)

Although prices were well below normal levels, the tariff did put a floor under sugar prices--a guaranteed minimum which did not exist for other agricultural products, and the duty paid price actually permitted

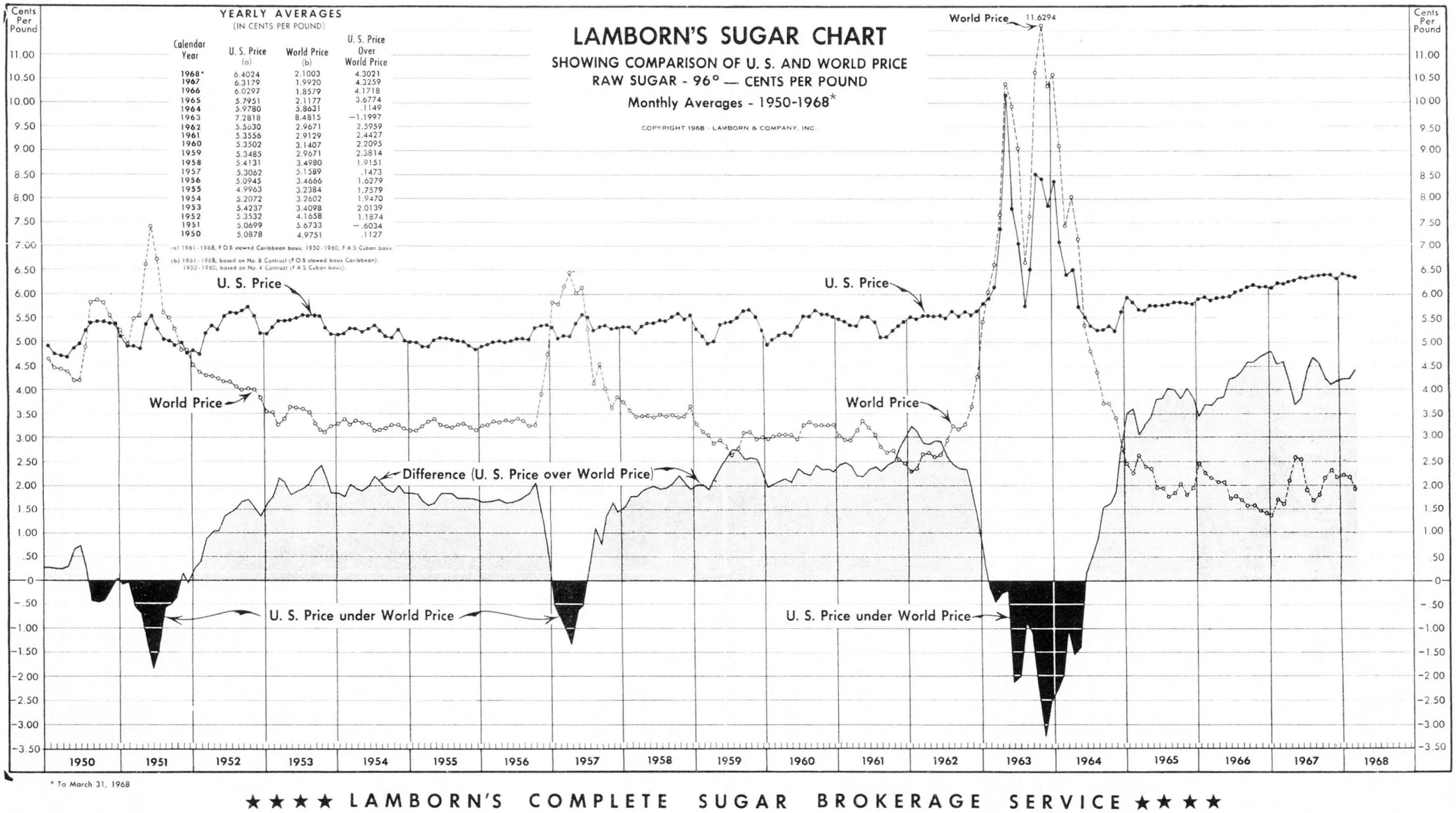

Figure 8. Monthly average of world and U. S. sugar prices in cents per pound 1950-1968.

expansion in some low cost domestic areas during this period of depression.

The increase in the beet growing areas came about not as a result of the high return on sugar-bearing crops, but because of the extremely poor returns on other agricultural products. Technological improvements and a desire to increase profits by increasing production were responsible for the higher production in Hawaii, Puerto Rico, and the Philippines.

It was generally agreed at this time that domestic sugar producers needed to have higher prices if they were to survive and receive reasonable profits for their sugar production (2, p. 21). The severe depression of the early thirties made it quite clear that increasing the tariff alone was not a satisfactory solution. Although tariff increases limited the inflow of foreign sugars into the U. S., they also encouraged further overproduction in the low cost, protected domestic areas. The results of the tariffs were thereby diminished and prices, as a result, were held at very low levels.

During 1933, attempts were made to develop a new program. Representative of all phases of the sugar industry met under the auspices of the Agricultural Adjustment Act to express their views on current sugar problems. Their plan, presented late in 1933, was called the Stabilization Agreement and was designed to help stabilize the sugar market in four ways:

(1) the fixing of minimum prices;

(2) limiting the entry of sugar into the U. S. market by assigning production quotas;

(3) limiting production in domestic areas to conform to quotas; and

(4) prohibiting unfair marketing practices (26, p. 74).

The plan was rejected by the government as being unworkable, on the grounds that it did not provide for effective control of production, nor did it solve the problem of sharing our sugar market with Cuba (9, p. 22).

The president presented a newly drafted plan for dividing the sugar market in his message of February, 1934. The plan was voted down by Congress, mainly through the efforts of the powerful sugar beet interests.

A compromise was finally reached to satisfy men like Senator Reed Smoot of Utah, co-author of the Smoot-Hawley Tariff of 1930. The new bill increased the beet grower's share of the projected sugar market by 100,000 tons and also included concessions to the domestic refining industry limiting the importation of refined sugar. (11, p. 105)

The new proposals were included in the Jones-Costigan Act which was presented by the President to Congress in early 1934 and after Congressional approval, it was signed into law on May 9, 1934.

Sugar legislation 1934-1965

The Jones-Costigan Act of 1934, an amendment to the Agricultural Adjustment Act, provided six basic features to deal with the problems of the sugar market:

(1) the determination of consumption requirements at reasonable prices for each given year;

(2) the division of the American sugar market between domestic and foreign suppliers;

(3) the allocation of production quotas for supplying nations and domestic areas;

(4) the adjustment of production to meet established quotas;

(5) the taxation of sugar processors to raise funds to support domestic producers; and

(6) the fair disbursement of sugar returns among processors, growers, and farm workers (69, p. 304).

The tax on processors was ruled unconstitutional by the Supreme Court in the Hossac-Mills Case of January 6, 1936, and the act was so weakened by this action that it was soon rewritten, although the allotment and quotas systems remained in effect during 1926 (50, p. 83).

In 1937 the President recommended that Congress enact new legislation embodying the same general principles employed in the Jones-Costigan Act. Congress drafted the Sugar Act of 1937, replacing the unconstitutional processing tax with a new excise tax which was unrelated to the government payments to growers. The bounty payments were to be made from funds specially appropriated for that purpose.

The Sugar Act of 1937 was scheduled to expire in 1940, but it was extended several times during the war to further encourage increased production (9, p. 23).

At the end of World War II, sugar prices and quotas were re-established and new sugar legislation was written. The Sugar Act of 1948 superseded the Act of 1937, and although it drew on the same general ideas and principles, it did make some changes in the earlier act. Whereas the Act of 1937 had used percentage quotas, the new act assigned fixed quotas to domestic areas and the Philippines, and variable quotas to Cuba and other foreign countries by disbursing the balance of U. S. sugar needs to these areas. Cuba thereby received most of the benefit of increased consumption in this country's sugar market.

Cuba received this favored treatment because of her response to U. S. needs during World War II and because Congress felt obligated to help the Cubans market their record sugar crops in the face of a declining world market (50, p. 89).

During 1951 the sugar act was reviewed and several amendments were proposed concerning quotas. The quotas for Puerto Rico and the Virgin Islands were increased. Participation in the variable quota was adjusted to include other countries in a greater share of the market and quotas were established on liquid sugar. These amendments were signed into law in 1952 after the Act had been extended by special legislation (22, p. 37).

In May of 1956, the Sugar Act of 1948 was again reviewed and amended before it was extended up to 1960. The amendments basically restored the domestic areas' right to participate in the growth of the U. S. sugar market. Also Cuba's share of the growing market was further limited to allow other foreign countries a greater share of sugar demand (9, p. 24).

The Cuban share of the market was getting too large at this time because of the preferential treatment she had received under earlier legislation, so the amendments were designed to allow for a more equitable distribution of this country's sugar quotas between the producing areas in the future. However, in 1960, an unfriendly government had taken over in Cuba, and Congress gave the President power to adjust Cuba's sugar quota without regard to other provisions of the Act. In mid-1960 the President cut Cuba's quota to zero and no Cuban sugar has entered this country since that time (9, p. 16).

In March of 1961, President Kennedy asked that current legislation be extended for 15 months and several amendments were passed to aid in the filling of Cuba's unused quota.

The loss of Cuban sugar and other changes in the sugar market had seriously weakened the Sugar Act and it was in need of extensive revision for the first time since it was written in 1948.

In 1962, a new look in sugar legislation was signed into law by the President. Some of the changes included increased quotas for domestic

producers, as well as a provision that allocated 65 per cent of any increase above the 9,700,000 ton consuption level to mainland beet and cane growers. A special acreage allotment of 65,000 tons of sugar per year was set aside to encourage the development of new beet production areas. This allocation was to be in effect until 1966.

A quota of 1,635,000 tons was held in reserve for Cuba, in the event that diplomatic relations were re-opened between Cuba and the United States. Until such time, the Cuban quota was to be treated as a global quota which was to be filled on a first-come, first-serve basis. Special consideration was given to western hemisphere nations, especially those that were purchasing U. S. agricultural exports. The President was also empowered to allocate as much as 150,000 tons of sugar quotas to friendly Latin American countries on a reduced import fee basis.

An import fee roughly equal to the difference between U. S. and world prices was to be charged on all raw sugar imported under the global quota. Other foreign suppliers with the exception of the Philippines, were to be assessed 10 per cent of the import fee in 1962, 20 per cent in 1963, and 30 per cent in 1964.

Most of these provisions were dropped early in 1963 to encourage the flow of sugar into the United States, and the global quota system as well as the import fee proved to be inadequate in the chaotic sugar market of 1963, because the program had been designed to operate with U. S. prices well above world prices.

As short supply forced world sugar prices to record levels, the Secretary of Agriculture was forced to search for enough sugar to meet the expected demand in the United States.

These obvious shortcomings of the Sugar Act of 1948, as amended, were enough to cause Congress to once again make serious changes in its operation during November of 1965.

Appendix B

New York Coffee and Sugar Exchange

The New York Coffee and Sugar Exchange was first opened for business in 1882 and was known only as the Exchange. It limited its operations to coffee for 32 years, but in 1914, when World War I had virtually shut down the sugar centers of London and Hamburg, the Exchange filled the sugar trading void. Facilities were expanded to allow for sugar trading and the Exchange was given its present name in 1916 (35, p. 6). New York soon became the center for the world's sugar trade which is still true today.

The Exchange performs many functions; the most important being its protective function known as hedging (35, p. 6). Without an exchange, growers and buyers would be left at the mercy of highly sensitive and fluctuating markets. By utilizing the Exchange, a grower may sell his sugar as far as a year in advance, thus assuring himself a profit. Similarly, sugar refiners and industrial users minimized their market risks through the purchase or sale of sugar futures (35, p. 6-7).

The hedge is the sugar market's own brand of price insurance. Hedges are used in many ways, but their basic purpose is to protect the sugar producer and the sugar user from any unforseen changes in the price of sucrose. For example, an industrial user, a candy manufacturer, higher costs will be offset by his profits on the futures contracts which he will then be selling, thus freeing him from any risk of higher prices. Other types of hedges follow similar reasoning.

Speculation also has its place on the Exchange as investors try to outguess the sugar market and in so doing assume the risks which ordinary buyers and sellers are not willing to take. The function of the Exchange, however, is to minimize specualtion for its members by eliminating many

of the outside factors which might influence sugar prices (35, p. 9).

On the New York Coffee and Sugar Exchange two different kinds of raw sugar contracts are traded, there is no futures trading in beet sugar: the number 8, or world contract, represents the sugar traded on the world sugar markets. Prices for number 8 contracts are generally very volatile although during normal times they oscilate between 2.5 and 4 cents per pound. This was the contract that speculators first began buying prior to the unusual sugar market of 1963-64 (71, p. 215).

Domestic sugar, covered by the number 7 contract, is intended for consumption in the U. S. under the auspices of current sugar legislation. Because U. S. prices have generally been well above world prices this particular contract had a relatively stable price record up until the early part of 1963. At that time, as rising world prices threatened to divert some of the usual U. S. supply to other countries, speculators jumped into domestic contracts as well, and prices soared.

Appendix C

Tables

Table 1. Centrifugal sugar: world production, consumption, stocks and prices

Crop year[a]	Production[a] (000 short tons)	Consumption[b] (000 short tons)	Ending stocks[c] (000 short tons)
1950-51	38,350	32,412	N.A.
1951-52	36,456	35,276	11,947
1952-53	37,186	36,913	14,944
1953-54	41,392	40,162	15,805
1954-55	41,966	41,666	15,886
1955-56	43,464	42,705	16,038
1956-57	45,631	46,068	14,042
1957-58	49,164	46,820	15,386
1958-59	54,378	49,598	18,290
1959-60	53,923	51,729	22,032
1960-61	60,140	54,253	23,935
1961-62	57,093	58,694	23,960
1962-63	54,856	58,954	21,803
1963-64	59,919	58,720	20,342
1964-65	72,567	61,562	24,211
1965-66	69,230	66,206	28,077
1966-67	71,464	68,675	28,619
1967-68	71,977	N.A.	N.A.

[a]Foreign Agricultural Service. Season includes all sugar produced from a campaign for which harvest begins after May 1 of first year shown and prior to April 30 of following year.

[b]International Sugar Council. Consumption is on a calendar year basis for first year shown.

[c]International Sugar Council. Stocks are ending stocks (December 31) for first year shown.

Table 2. Raw sugar price, per pound, duty paid, New York, by months, 1950-1968

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
						(cents per pound)							
1950	5.74	5.59	5.54	5.53	5.71	5.78	6.07	6.25	6.25	6.23	6.19	6.30	5.93
1951	6.09	5.96	5.90	5.81	6.36	6.59	6.30	6.00	6.00	5.93	5.97	5.79	6.06
1952	5.80	5.77	6.16	6.31	6.21	6.43	6.48	6.43	6.50	6.59	6.44	6.06	6.26
1953	6.04	6.16	6.33	6.38	6.35	6.37	6.41	6.40	6.41	6.40	6.15	6.05	6.29
1954	6.04	6.06	6.18	6.19	6.10	6.15	6.19	6.09	5.98	5.96	6.15	5.96	6.09
1955	5.96	5.94	5.84	5.82	5.95	6.02	6.01	6.02	6.00	6.06	5.97	5.83	5.95
1956	5.88	5.88	5.95	6.02	6.03	6.00	6.11	6.10	6.09	6.29	6.33	6.37	6.09
1957	6.35	6.10	6.18	6.14	6.37	6.53	6.45	6.13	6.17	6.21	6.12	6.15	6.24
1958	6.15	6.15	6.03	6.21	6.29	6.27	6.28	6.28	6.37	6.47	6.35	6.44	6.27
1959	6.15	5.99	5.84	5.92	6.30	6.31	6.29	6.37	6.51	6.55	6.44	6.17	6.24
1960	5.89	6.00	6.11	6.17	6.09	6.25	6.48	6.47	6.59	6.52	6.53	6.46	6.30
1961	6.39	6.32	6.25	6.25	6.46	6.48	6.39	6.06	6.06	6.19	6.29	6.40	6.30
1962	6.45	6.37	6.43	6.43	6.43	6.45	6.39	6.54	6.43	6.52	6.44	6.54	6.45
1963	6.70	6.80	7.04	8.26	11.08	8.70	7.95	6.65	7.45	9.42	9.34	8.78	8.18
1964	9.29	8.02	7.33	7.43	6.65	6.45	6.25	6.18	6.20	6.27	6.17	6.55	6.90
1965	6.85	6.79	6.61	6.59	6.73	6.72	6.73	6.77	6.82	6.82	6.80	6.75	6.75
1966	6.88	6.92	6.84	6.89	6.90	6.92	7.00	7.05	7.11	7.15	7.12	7.14	6.99
1967	7.13	7.21	7.18	7.22	7.25	7.32	7.30	7.33	7.34	7.37	7.38	7.30	7.28
1968	7.41	7.38	7.35	7.42	7.48	7.53	7.59	7.59	7.62	7.66	7.58	7.62	7.52

Table 3. World raw sugar price, per pound, by months 1950-1968

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual average
						(cents per pound)							
1950	4.62	4.47	4.44	4.37	4.21	4.21	4.89	5.83	5.88	5.84	5.58	5.36	4.98
1951	5.22	4.96	5.48	5.57	6.62	7.41	6.75	5.61	5.52	5.28	4.83	4.84	5.67
1952	4.54	4.38	4.30	4.30	4.24	4.17	4.16	4.05	4.00	4.01	4.00	3.84	4.17
1953	3.55	3.52	3.27	3.38	3.65	3.62	3.60	3.53	3.29	3.15	3.10	3.27	3.41
1954	3.30	3.39	3.28	3.36	3.32	3.27	3.13	3.18	3.21	3.25	3.26	3.19	3.26
1955	3.17	3.17	3.22	3.31	3.38	3.26	3.22	3.22	3.27	3.28	3.19	3.16	3.24
1956	3.26	3.28	3.34	3.31	3.36	3.36	3.40	3.34	3.24	3.24	3.92	4.77	3.48
1957	5.83	5.80	6.17	6.46	6.02	6.12	5.27	4.13	4.55	4.03	3.63	3.87	5.16
1958	3.74	3.55	3.42	3.45	3.47	3.42	3.50	3.46	3.48	3.41	3.42	3.64	3.50
1959	3.27	3.11	3.05	2.88	2.94	2.81	2.66	2.78	3.09	3.10	2.96	3.00	2.97
1960	2.97	3.02	3.05	3.04	3.05	2.97	3.26	3.31	3.25	3.25	3.25	3.25	3.14
1961	3.03	2.97	2.97	3.14	3.35	3.20	3.05	2.80	2.69	2.73	2.53	2.46	2.91
1962	2.30	2.36	2.65	2.69	2.60	2.63	2.92	3.24	3.18	3.28	3.65	4.29	2.98
1963	5.41	6.06	6.62	7.65	10.36	9.92	9.05	6.63	7.63	10.67	11.63	10.36	8.50
1964	10.64	9.11	7.43	8.05	7.12	5.33	4.80	4.37	3.71	3.70	3.40	2.76	5.87
1965	2.41	2.25	2.63	2.40	2.35	1.96	1.94	1.79	1.85	2.03	1.81	1.96	2.12
1966	2.47	2.25	2.17	2.09	2.09	1.72	1.78	1.69	1.55	1.59	1.47	1.41	1.86
1967	1.35	1.71	1.61	2.10	2.59	2.52	1.90	1.68	1.80	2.15	2.32	2.17	1.99
1968	2.20	2.17	1.93	1.84	1.98	1.78	1.71	1.66	1.45	1.90	2.39	2.77	1.98

Table 4. Final basic and adjusted quotas for the years 1952 and 1959

1952 Basic quotas--final		1958 Basic quotas--final	
	(short tons value)		
Domestic area		Domestic area	
Domestic beet	1,800,000	Domestic beet	2,043,480
Mainland cane	500,000	Mainland cane	628,799
Hawaii	1,052,000	Hawaii	1,140,462
Puerto Rico	910,000	Puerto Rico	1,192,498
Virgin Islands	6,000	Virgin Islands	16,261
Total domestic	4,268,000	Total domestic	5,021,500
Foreign area		Foreign area	
Philippines	974,000	Basic quota	4,378,500
Cuba	2,621,851	Non-quota purchase	-
Other foreign	36,149		
Total foreign	3,632,000	Total foreign	4,378,500
Total quotas	7,900,000	Total requirements	9,400,000

Adjusted quotas--final		Adjusted quotas--final	
Domestic area		Domestic area	
Domestic beet	1,560,000	Domestic beet	2,267,665
Mainland cane	533,296	Mainland cane	697,783
Hawaii	972,000	Hawaii	977,970
Puerto Rico	982,860	Puerto Rico	969,875
Virgin Islands	6,400	Virgin Islands	12,405
Total domestic	4,054,556	Total domestic	4,925,698
Foreign area		Foreign area	
Philippines	774,000	Basic quota	4,474,302
Cuba	3,025,295	Non-quota purchase	-
Other foreign	46,149		
Total foreign	3,845,444	Total foreign	4,474,302
Total quotas	7,900,000	Total requirements	9,400,000

Table 5. Final 1963 quotas and quota charges in continental United States

(short tons, raw value)

Country or area	Quotas: Final basic	Quotas: global allocations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balances
Domestic beet sugar	2,990,127		(291,537)	2,698,590[d]	2,964,790	(266,200)
Mainland cane sugar	1,009,873		0	1,009,873	1,072,202	(62,329)
Hawaii	1,110,000		(40,000)	1,070,000[d]	1,032,541	37,459
Puerto Rico	1,140,000		(270,000)	870,000[d]	875,245	(5,245)
Virgin Islands	15,000		0	15,000	15,000	0
Total domestic	6,265,000		(601,537)	5,663,463	5,959.778	(296,315)
Philippines	1,050,000		197,618	1,247,618	1,194,833	52,785
Argentina	20,000	209,701		229,701	228,568	1,133
Australia	43,339	180,367		223,706	223,584	122
Belgium	182	7,365		7,547	7,546	1
Brazil	195,793	281,696		477,489	469,822	7,667
British Honduras	10,758			10,758	1,712	9,046
British West Indies	98,050		43,580	141,630	141,356	274
China (Formosa)	38,114	33,155		71,269	71,269	0
Columbia	32,581	45,030		77,611	45,030	32,581
Costa Rica	27,048	12,984	605	40,637	40,637	0
Dominican Republic	336,243	197,558	71,302	605,103	589,999	15,104
Ecuador	27,048	28,156	2,601	57,805	56,482	1,323
El Salvador	11,065	6,649	1,945	19,659	18,955	704
Fiji Islands	10,758	37,946		48,704	48,565	139
France		22,935		22,935	22,935	0
French West Indies	32,581	60,771	945	94,297	94,297	0
Guatemala	21,823	16,655	12,572	51,050	51,050	0

Table 5. Continued

(short tons, raw value)

Country or area	Final basic	Quotas global allocations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balances
Haiti	21,823	11,555	7,162	40,540	40,423	117
India	21,823	97,638		119,461	118,963	498
Ireland	10,000			10,000	9,973	27
Mauritius		66,605		66,605	66,605	0
Mexica	206,243	21,075	159,723	387,041	379,379	7,662
Nicaragua	27,048	15,176		42,224	38,392	3,832
Panama	16,290	234		16,524	10,183	6,341
Paraguay	10,758			10,758	0	10,758
Peru	206,243	207,981		414,224	413,418	806
Reunion		9,893		9,893	9,893	0
South Africa	21,823	110,449		132,272	132,272	0
Southern Rhodesia		10,589		10,589	10,589	0
Turkey		6,578		6,578	6,578	0
Venezuela		11,907		11,907	11,907	0
Unallocated		15,010	15,392	30,402	0	30,402
Canada	631[e]		(631)			0
Hong Kong	3[e]		(3)			0
Netherlands	10,758[e]		(10,758)			0
United Kingdom	516[e]		(516)			0
Global			100,000[f]			
Total foreign	2,509,342	1,725,658[f]	601,537	4,736,547	4,555,215	181,322

Table 5. Continued

(short tons, raw value)

Country or area	Quotas: Final basic	Quotas: global allocations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balances
Grand Total	8,774,342	1,725,658[f]	0	10,400,000	10,514,993	(114,993)

[a]Proration of quota withheld from Cuba.

[b]Direct-consumption limitations were: Hawaii--35,658; Puerto Rico--156,000; Philippines--59,920; Belgium--182; Ireland--10,000; and Panama--3,817.

[c]Direct-consumption: Hawaii--26; Puerto Rico--154,705; Philippines--36,735; Belgium--181; Ireland--9,973; and Panama--3,816. Total: 205,436.

[d]Despite deficits declared, full basic quota remained available.

[e]Withheld pursuant to Section 202(d) and (e) of the Sugar Act.

[f]100,000 tons of quota deficits are included in global allocations to individual countries.

Table 6. Final 1964 quotas and quota charges in the continental United States

(short tons, raw value)

Country or area	Quotas: Final basic	Quotas: global allocations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balances
Domestic beet sugar	2,698,590	0		2,698,590	2,698,514	76
Mainland cane sugar	911,410	0		911,410	905,511	5,899
Hawaii	1,110,000	0		1,110,000	1,110,000	0
Puerto Rico	1,140,000	0	(225,000)	915,000[d]	792,788	122,212
Virgin Islands	15,832	0		15,832	15,856	(24)
Total Domestic	5,875,832	0	(225,000)	5,650,832	5,522,669	128,163
Philippines	1,050,000	46,269	123,521	1,219,790	1,217,359	2,431
Argentina	20,000	0		20,000	19,751	249
Australia	40,366	174,732		215,098	215,098	0
Belgium	182	0		182	180	2
Brazil	182,363	0		182,363	182,363	0
British Honduras	10,020	5,014	(9,046)[e]	5,988	5,988	0
British West Indies	91,325	51,199		142,524	142,228	296
China (Formosa)	35,499	47,114		82,613	81,156	1,457
Columbia	30,346			30,346	28,292	2,054
Costa Rica	25,193	20,806	12,120	58,119	40,526	17,593
Dominican Republic	322,096	31,766	48,960	402,822	398,462	4,360
Ecuador	25,193	32,846		58,039	57,920	119
El Salvador	10,306	10,245		20,551	20,571	(20)
Fiji Islands	10,020	44,536		54,556	54,517	39
France		845		845	845	0
French West Indies	30,346	3,944		34,290	34,286	4
Guatemala	20,326	19,631	5,066	45,023	37,251	7,772

Table 6. Continued

(short tons, raw value)

Country or area	Final basic	Quotas global allocations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balances
Haiti	20,326	0		20,326	14,957	5,369
India	20,326	90,227		110,553	110,553	0
Ireland	10,000	0		10,000	0	10,000
Malagasy Republic		11,559		11,559	11,559	0
Mexico	192,096	224,599	62,730	479,425	480,120	(695)
Nicaragua	25,193	25,261		50,454	50,340	114
Panama	15,173	10,384	(6,341)[e]	19,216	19,216	0
Peru	192,096	33,115	9,180	234,391	232,780	1,611
South Africa	20,326	99,634		119,960	119,960	0
Southern Rhodesia		10,260		10,260	10,260	0
Unallocated		509,875[f]		509,875	0	509,875
Canada	631		(631)			
Hong Kong	3[e]		(3)			
Netherlands	10,020[e]		(10,020)			
Paraguay	10,020[e]		(10,020)			
United Kingdom	516[e]		516			
Total Foreign	2,420,307	1,503,861	225,000	4,149,168	3,586,538	562,630

Table 6. Continued

Country or area	Final basic	Quotas global allocations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balances
	(short tons, raw value)					
Grand Total	8,296,139	1,503,861	0	9,800,000	9,109,207	690,793

[a]Withheld pursuant to Section 202(d) and (e) of the Sugar Act.

[b]Direct-consum$_1$tion limitations were: Hawaii--33,516; Puerto Rico--147,000; Philippines--59,920; Belgium--182; Ireland--10,000; and Panama--3,817. Total: 208,380.

[c]Direct-consumption: Hawaii--1,133; Puerto Rico--146,505; Philippines--56,756; Belgium--180; Ireland--0; and Panama--3,806. Total: 208,380.

[d]Despite deficits declared, the full basic quota remained available.

[e]Withheld pursuant to Section 202(d) and (e) of the Sugar Act.

[f]503,861 short tons, raw value, of global quota were not made available for allocation.

Table 7. Final 1968 quotas and quota charges in the continental United States

Country or area	Final basic	Quotas Sec. 202(d) prorations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balance
			(short tons, raw value)			
Domestic beet sugar	3,311,000		(195,333)	3,115,667[d]	3,085,242	30,425
Mainland cane sugar	1,204,000			1,204,000	1,203,921	79
Hawaii	1,191,704			1,191,704	1,191,704	0
Puerto Rico	1,140,000		(625,000)	515,000[d]	504,081	10,919
Virgin Islands	15,000		(15,000)			0
Total Domestic	6,861,704		(835,333)	6,026,371	5,984,948	41,423
Philippines	1,126,020			1,126,020	1,124,002	2,018
Argentina	27,964	30,111	18,180	76,255	76,255	0
Australia	108,249	87,853	7,174	203,276	203,276	0
Bolivia	2,706	2,913	1,484	7,103	7,103	0
Brazil	227,324	244,771	147,786	619,881	619,881	0
British Honduras	6,615	5,404	3,861	15,880	15,880	0
British West Indies	90,809	74,186	52,976	217,971	217,971	0
China (Formosa)	45,104	36,605	2,989	84,698	84,698	0
Colombia	24,055	25,902	15,637	65,594	65,594	0
Costa Rica	26,762	28,815	17,687	73,264	73,264	0
Dominican Republic	227,324	244,777	234,929	707,030	707,030	0
Ecuador	33,076	35,614	21,503	90,193	90,193	0
El Salvador	16,538	17,809	10,932	45,279	45,279	0
Fiji Islands	23,755	19,279	1,574	44,608	44,608	0
French West Indies	28,566	23,338	14,333	66,237	66,237	0
Guatemala	22,552	24,284	14,907	61,743	61,743	0
Haiti	12,629	13,598	1,193	27,420	27,420	0

Table 7. Continued

Country or area	Final basic	Quotas Sec. 202(d) prorations[a]	Deficits and deficit prorations	Final adjusted quotas[b]	Total charges[c]	Balance
			(short tons, raw value)			
Honduras	2,706	2,913	1,787	7,406	7,406	0
India	43,300	35,141	2,870	81,311	81,311	0
Ireland	5,351			5,351	5,351	0
Malagasy Republic	5,112	4,149	339	9,600	9,600	0
Mauritius	9,923	8,053	657	18,633	18,633	0
Mexico	232,435	250,277	151,107	633,819	633,789	30
Nicaragua	26,762	28,815	(742)	54,835	50,464	4,371
Panama	16,839	18,133	2,467	37,439	37,439	0
Peru	181,318	195,236	117,877	494,431	492,952	1,479
South Africa	31,873	25,868	2,113	59,854	59,785	69
Swaziland	3,909	3,173	260	7,342	7,342	0
Thailand	9,923	8,053	(17,976)			0
Venezuela	11,426	12,301	7,429	31,156	31,156	0
Foreign Total	2,630,925	1,507,371	835,333	4,973,629	4,965,662	7,967
Grand Total	9,492,629	1,507,371	0	11,000,000	10,950,610	49,390

[a] Proration of quotas withheld from Cuba and Southern Rhodesia.

[b] Direct-consumption limitations were: Hawaii--37,620; Puerto Rico--165,000; Philippines--59,920; Panama--3,817; Ireland--5,351. Total: 271,708.

[c] Direct consumption: Hawaii--4,285; Puerto Rico--164,508; Philippines--20,316; Panama--3,816; Ireland--5,351. Total: 198,276.

[d] Despite deficits declared the full basic quota remained available.

Table 8. World market and U. S. sugar prices, November, 1960

Item	Cents per pound (as is)
Raw sugar "World Market" producing country	3.25
Freight	.25
Quota premium	2.37
Tariff	.63
Duty or duty free, New York, in bulk for U. S. comsumption	6.50
Excise tax	.50
Total, Inc. excise tax, New York	7.00
Cost of raw sugar per pound of refined	7.49
Wholesale refined, New York 5-pound packages	9.51
Average retail price, U. S., 5-pound packages	11.88

Table 9. Frequency distribution of an index of variability (annual range as a per cent of the mid-range) 1952-1963

Variability	Sugar (#7)	Sugar (#8)	Coffee (B)	Cocoa	Cotton	Cottonseed oil	Soybean oil	Copper	Zinc	Lead	Rubber	Hides	Potatoes	Wool tops	Grease wool	Soybeans	Soybean meal	Corn	Wheat	Oats	Rye
00-19	4		1		8			1						3	1				1		
10-19	7	3	4		3	4	4	3	5	4	1			3	3	7	1	8	4	3	2
20-29		4	3	2	1	4	7	3	3	7	2	4	1	4	7	2	4	4	7	6	5
30-39			1	4		4	1	2	2	1	3	4	1	2	1	2	4			3	3
40-49		2	3	2				1	2		3	2				1					
50-59				3				1			2	1	4				3				1
60-69		1									1										1
70-79	1[a]			1								1									
80-89		1											2								
90-99													2								
100-109		1[a]																			
110-119													2								
TOTAL	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

[a]1963

VITA

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