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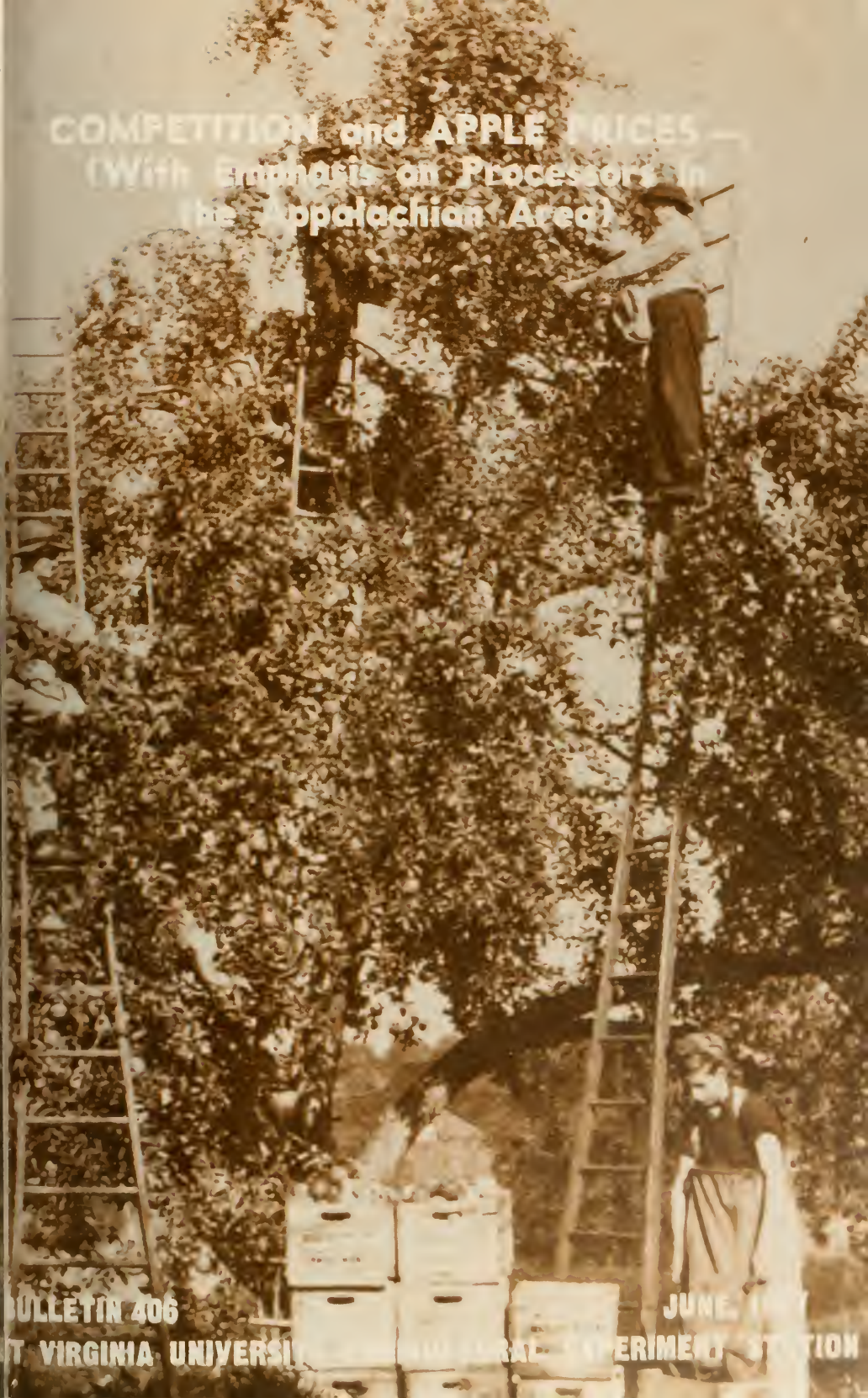
Competition and apple prices : with emphasis on processors in the Appalachian area

Homer C. Evans

COMPETITION and APPLE PRICES —
(With Emphasis on Processors in the Appalachian Area)



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Summary

The Appalachian Area produces about one-fifth of the national commercial apple crop. Production has been declining both in the United States and in the Appalachian Area. Nevertheless, sales to processors have increased during the last 20 years. The production of sauce and slices has expanded, especially the production of sauce. In the Appalachian Area approximately one-half of the crop has been sold in recent years to processor outlets. About one-half of the national production of sauce and slices is produced here.

Six processors do most of the apple processing in the area. One firm generally announces an opening price for apples, and all other firms follow with similar if not identical prices. These conditions, taken alone, suggest the possibility of more profits and less output than would be the case under perfect competition.

Indications are that the supply of apples available to processors in the Appalachian Area is elastic and dependent upon processor price relative to price paid for fresh apples. Also, data indicate that processing costs per unit do not vary within the present range of processor capacities.

An effective cooperative firm is present in the Appalachian Area which returns to its patrons all receipts over costs of operation. Other firms meet this competition by paying bonuses to their suppliers. Implicit price deals are widely used. These added returns encourage apple growers to sell more apples to the processors.

The entry of new firms into the processor sub-group is relatively easy. Three firms have entered since 1939, and in recent years they have been doing between one-fourth and one-third of the total processing in the area.

From this analysis of the situation, it appears that competition among processors is strong and there is little opportunity for excess profits over a period of time. This means that the processor price is efficient in the allocation of apples between fresh and processor outlets.

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COMPETITION AND APPLE PRICES--
(With Emphasis on Processors in the Appalachian Area)

HOMER C. EVANS*

Introduction

Apple processors provide an important outlet for apples in the Appalachian Area.[1] This outlet has been taking approximately one-half the crop in recent years. Six firms buy most of the apples for processing in the area.

There appears to be some question as to the amount of competition among processors in the Appalachian Area as evidenced by the Federal Trade Commission (FTC) charges in 1952 and by the growers' interest in organizing in order to bargain with processors.

Objective

The purpose of this study is to determine the nature and the amount of competition among apple processors in the Appalachian Area. The effects of competition show up through price. Price directs production and consumption and distributes income. How well price does its regulating job is of interest to all.

Procedure

In order to accomplish the objective of this study the market and its structure must be defined rather closely.[2] It is not enough to define a market as "the area within which the forces of supply and demand converge to establish a single price." There is need to go further and identify the boundaries of a particular market and set it apart from other markets. A decision also must be made concerning what firms to include or exclude in the market under study.

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[1]The Appalachian Area refers to the commercial apple producing sections of Pennsylvania, Maryland, West Virginia, and Virginia. Figure 1 outlines the area. Although the area extends from the southern boundary of Virginia southwest of Roanoke to Carlisle, Pennsylvania, the bulk of the production is concentrated in the northern part of the area.

[2]For a complete discussion of any points covered in this study see Bul. 405 W. Va. Univ. Agr. Exp. Sta., by Homer C. Evans, June 1957.

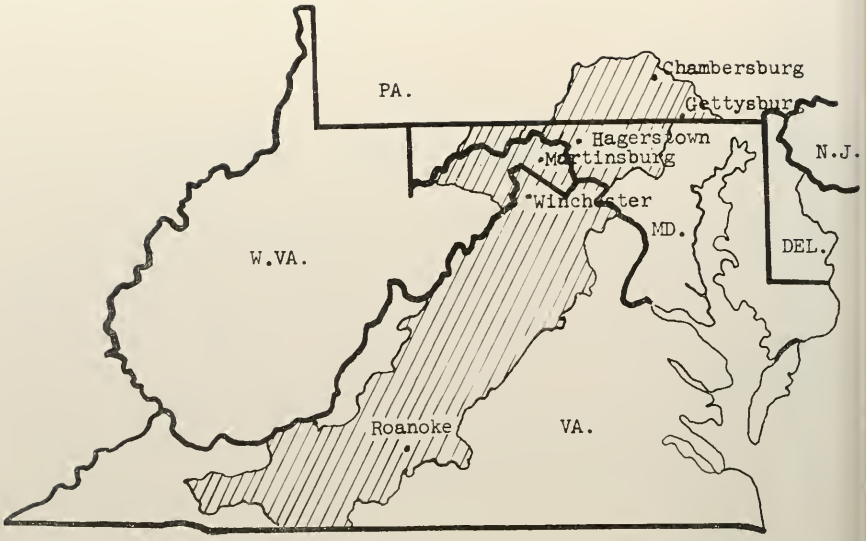


FIGURE 1. Appalachian Area (outline of commercial apple producing sections of Pennsylvania, Maryland, West Virginia, and Virginia).

For two firms to be in the same market they must meet two requirements: they must sell (or buy) substitute products, and they must be confronted with similar technological, market, and organization problems; that is, they must belong to the same industry. Therefore, the firms in a market are relatively homogeneous, are confronted by similar problems, and are in relatively close competitive relationship. Perhaps *market sub-group* would be a better term than *market* to describe such a group of buyers or sellers. It is within a market sub-group that sellers compete actively with one another, buyers and sellers bargain actively with one another, and price is established.

Each market sub-group is composed of a group of buyers and a group of sellers. Therefore, any apple processor, in addition to other buyers, also is confronted with apple sellers.

Before attempting to outline the market sub-group which includes apple processors, a brief historical account of the production and utilization of apples is presented, with particular emphasis on the Appalachian Area. This account will give some idea of the environment in which apple sellers and buyers operate.

Apple Production

Production of apples has been reported in every state in the union, but commercial production is limited to 35 states. Figure 2 gives the distribution of apple trees in the United States. The bulk of the

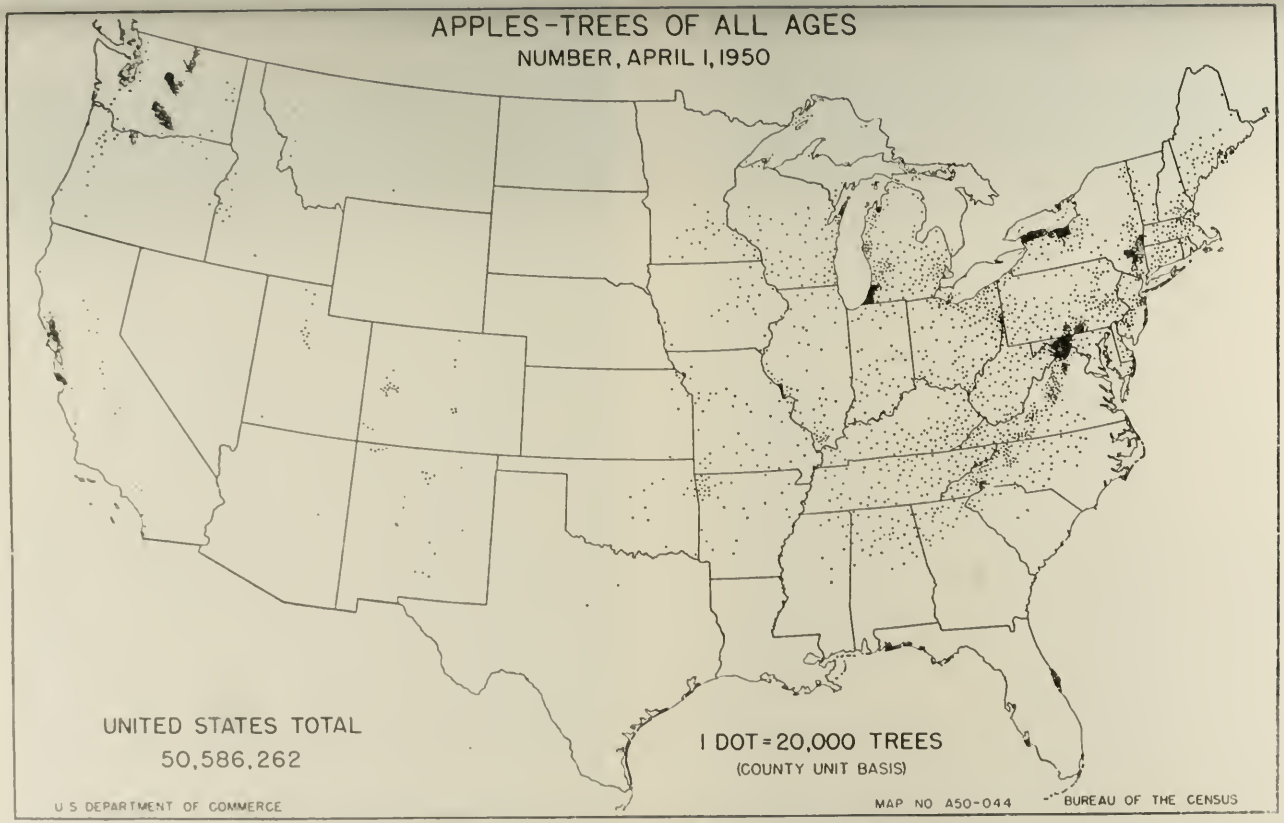


FIGURE 2. Distribution of apple trees, United States, 1950.

THE APPALACHIAN AREA produces approximately one-fifth of the national apple crop.

MODERN processing plant surrounded by orchards.

commercial production is concentrated in a few areas. Washington State has been the most important area in recent years, accounting for about one-fourth of the commercial crop. The Appalachian Area is second, producing approximately one-fifth of the total crop. New York state is third, accounting for slightly less than the Appalachian Area. Michigan and California produce smaller, but important, quantities. Production of the remaining one-fourth of the crop is scattered over several states, chiefly those east of the Mississippi River. About two-thirds of the national crop comes from an area extending about 500 miles, mostly to the north and west from the Appalachian Area, Figure 2.

Average annual commercial production in the United States from 1934 to 1954 was 112,560,000 bushels, Figure 3. During the same period there was an average annual decrease of 1,126,000 bushels.

Production in the Appalachian Area has followed a trend similar to that for the United States and has tended to decline over the period 1934-1954, with an average annual decrease of 511,000 bushels, Figure 4.

Utilization

While total national production has been declining, sales to processors have been increasing. From 1934 to 1954 annual sales to processors averaged 28,760,000 bushels, or about 25 per cent of the crop.

APPLES being delivered to processors.

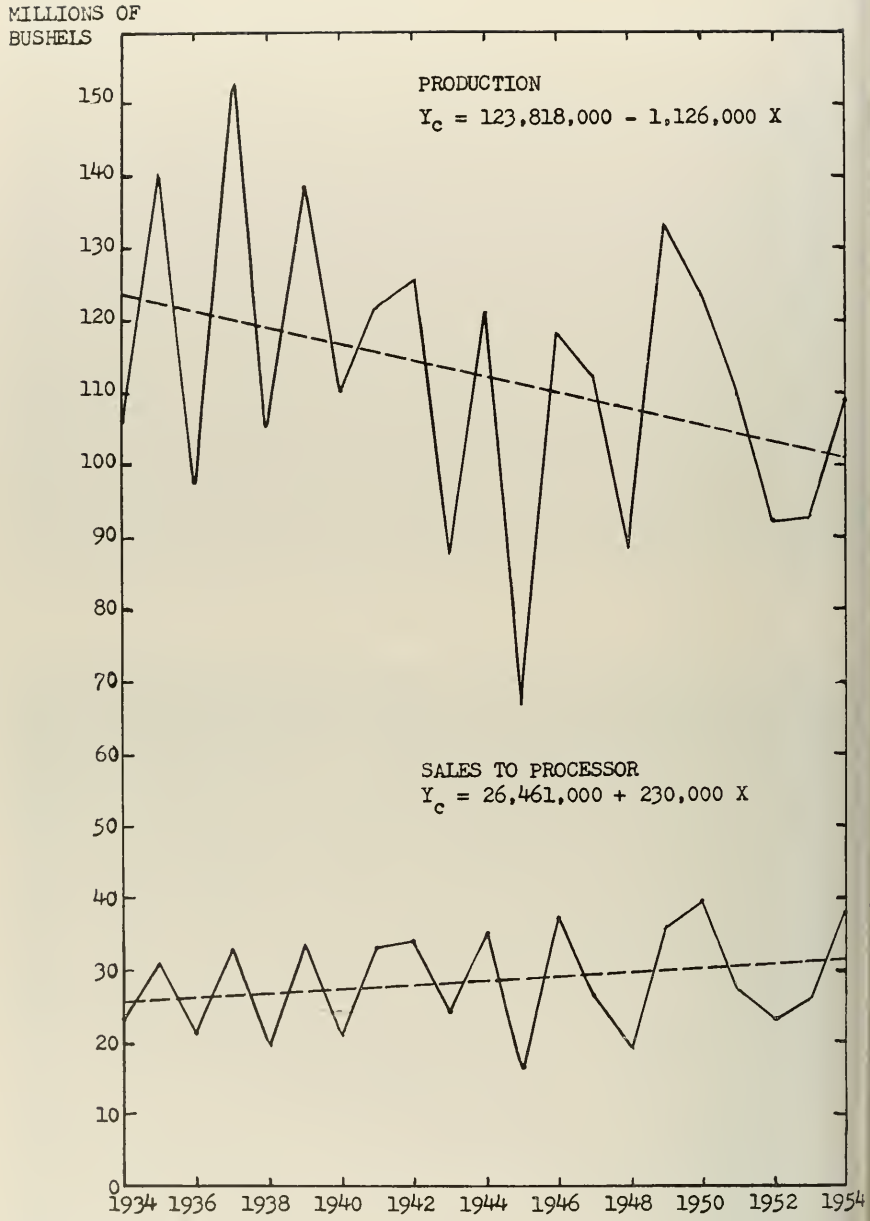


FIGURE 3. Apples—Production and trend in production of commercial crop; sales to the processor and trend in sales, United States, 1934-54. (Source: United States Department of Agriculture, Crop Reporting Board.)

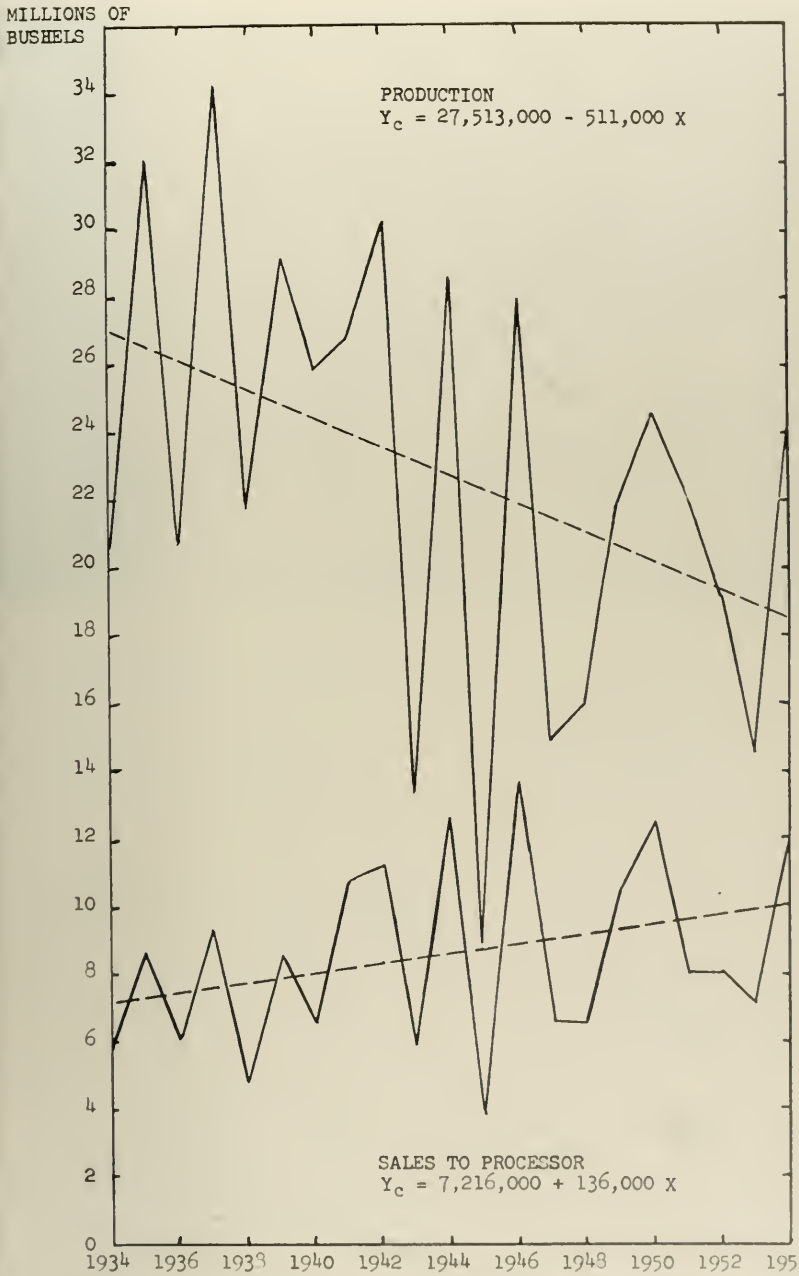


FIGURE 4. Apples—Production and trend in production of commercial crop; sales to the processor and trend in sales, Appalachian Area, 1934-54. (Source: United States Department of Agriculture, Crop Reporting Board.)

TRIMMING apples.

Figure 3. During the same period an annual average increase of 230,000 bushels was going to processors.

In the Appalachian Area, sales to processors have increased. During the period 1934-54 there was an average annual increase of 136,000 bushels, Figure 4. In recent years approximately one-half of the crop in the Appalachian Area has been sold to processors.

Although there appears to be a rather high degree of substitution among varieties of apples, some varieties are better suited for some uses than others. Red Delicious, McIntosh, and Winesap are preferred for fresh use, whereas Gravenstein, Greening, York, and Baldwin are preferred for processing. Stayman, Rome Beauty, Golden Delicious, and Grimes Golden are considered desirable by either the fresh or processing outlets. Although there is a rather wide distribution of each variety, the Appalachian Area and New-York state produce a large proportion of processing and dual purpose varieties.

Applesauce and slices are the principal apple products produced both in the United States and in the Appalachian Area. Table 1 gives the total pack of sauce in the United States and the percentage of sauce packed in the various areas. The Appalachian Area supplies approximately one-half of the total pack, followed by New York and California, Table 2 gives the total pack of sliced apples in the United States and the percentage packed in the various areas and states. Again the Ap-

Table 1. Applesauce—Total Pack United States and Percentage Distribution by States or Groups of States, 1934-1954

Year	U. S. (Thousand Cases)	Per cent of U. S. Pack			
		Md., Pa., Va., W. Va.	N. Y.	Calif.	Others
1934	1,892	—	—	—	—
1935	1,887	—	—	—	—
1936	2,353	48.9	49.7	—	1.4
1937	3,161	58.7	40.0	—	1.3
1938	1,526	44.7	54.7	—	0.6
1939	3,056	46.1	53.5	—	0.4
1940	2,634	62.1	36.9	—	1.0
1941	4,182	52.0	45.3	—	2.7
1942	4,590	59.7	37.0	—	3.3
1943	2,225	44.7	48.5	—	6.8
1944	4,301	64.3	28.3	—	7.4
1945	1,984	66.6	a	—	33.4
1946	8,239	57.3	27.5	—	15.2
1947	6,083	56.0	36.8	—	7.2
1948	4,851	60.2	31.6	6.3	1.9
1949	8,611	54.4	30.7	8.3	6.6
1950	12,541	53.4	31.8	7.3	7.5
1951	8,982	46.8	38.0	10.2	5.0
1952	8,914	46.7	32.1	15.8	5.4
1953	11,204	48.1	31.2	14.9	5.8
1954	15,294	48.2	32.8	14.0	5.0

a = Included in other states.
Source: National Canners Association, Washington, D.C.

palachian Area is a major source of supply, producing about one-half the total supply.

Competition Among Apple Sellers

Apple sellers will be considered first in an attempt to delineate the market sub-group involving apple processors in the Appalachian Area. It will be shown that all apple growers (sellers) in the United States belong to the same market sub-group because they are selling substitutive products and are confronted with similar problems.

An apple grower in the Appalachian Area may sell his apples through any of the following outlets: buyers of fresh apples in the Appalachian Area, f.o.b., orchard; processor buyers, f.o.b., processing plant; and any one of many central wholesale markets, f.o.b., central market. Usually apples are sold on the basis of U. S. Grades and Standards, regardless of types of outlet (fresh or processor) or market place. Grades standardize apples; that is, they classify apples by variety, quality, and size.

Table 2. Sliced Apples—Total Pack United States and Percentage Distribution by States or Groups of States, 1934-1954

Year	U. S. (Thousand Cases)	Per cent of U. S. Pack			
		Md., Pa., Va., W. Va.	N. Y.	Wash., Ore.	Others
1934	2,584	—	—	—	—
1935	2,331	—	—	—	—
1936	2,620	34.2	4.1	59.1	2.6
1937	2,672	53.5	9.7	35.1	1.7
1938	1,750	49.7	11.6	37.1	1.6
1939	2,840	48.9	14.2	36.2	0.7
1940	2,249	52.8	13.7	32.5	1.0
1941	4,348	51.4	13.0	31.0	4.6
1942	4,164	61.4	15.6	21.6	1.4
1943	1,878	51.3	23.1	24.8	0.8
1944	3,355	60.8	18.7	19.0	1.5
1945	1,191	73.8	a	25.7	0.5
1946	3,266	58.6	22.7	14.1	4.6
1947	2,241	54.2	33.2	11.0	1.6
1948	1,687	58.5	28.5	11.9	1.1
1949	4,213	56.6	27.6	8.8	7.0
1950	5,264	59.5	21.9	14.7	3.9
1951	3,388	60.1	29.4	7.4	3.1
1952	2,560	60.8	27.5	8.6	3.1
1953	2,941	47.2	34.7	12.8	5.3
1954	4,709	56.0	27.9	9.7	6.4

a = Included in other states.
Source: National Canners Association, Washington, D.C.

The prices of all grades, varieties, and sizes of apples are closely related and tend to move together due to their high degree of substitution. Also, all market places are tied together because apple sellers substitute one market place for another. For example, if farmer A can realize a higher f.o.b. orchard price for his apples by selling in Chicago than by selling in Atlanta, he will tend to substitute Chicago for Atlanta until returns are the same. In the same way he determines whether to sell to the fresh or processor outlets. Therefore, all apple growers are selling substitute products.

Technological, marketing, and organizational problems which confront farmer A in the production of apples are similar to those confronting all other apple growers. Although apples are produced over a large part of the United States, the bulk of the commercial crop is produced in four areas, Figure 2. The time necessary to establish a producing orchard is about the same in each area. In the various areas the length of growing season and production costs present similar problems. Costs are somewhat higher in some areas than in others, but in general, yields in these areas also will be higher.

INSPECTING peeled apples.

The weather presents many problems for apple growers. Frost, winter freeze, drought, and hail are some of the major problems. Certainly, the probability of any one of these occurring varies among areas. However, there may be certain offsetting effects. For example, winter freeze seems to be an important hazard in the Pacific Northwest, whereas spring frosts are important in the East. The temperature and amount of sunshine affect the finish of the fruit, and some areas are particularly favored in this respect. This tends to differentiate the fruit of these areas from the fruit of others.

All producing areas sell through the same market places. Some areas depend more on processor outlets than do others. However, for any grower there appears to be a number of alternative market places. The marketing problems confronting all apple producers are quite similar.

Therefore, all apple growers are in the same industry and sell substitute products. This qualifies all such growers for the same market sub-group, as defined in this study.

Any apple producer is only one among many, but he produces an insufficient quantity of any one variety to influence the price. In 1950 there were over 2,500 commercial apple producers in the Appalachian

MODERN fresh packing plant—about one-half of the crop in the Appalachian Area goes to the fresh market.

Area. The 1950 Census of Agriculture reported over 1.5 million farms producing apples.

Each grower is a price taker. He may decide how much to produce and sell, but he must take price as given. Even though these are factors which deviate from the purely competitive situation, apple growers in the marketing of their apples act basically as though they were selling under conditions of pure competition. Each seller has such a small volume relative to the market sub-group that he exerts no perceptible influence on the price of apples; new growers may freely enter apple production and their decision to do so is of no concern to those already producing and selling apples; and knowledge of alternatives is rather complete.

Competition Among Apple Buyers

In the Appalachian Area apple sales are divided almost equally between fresh and processor outlets. Competition among buyers of fresh apples is similar to competition among apple sellers. Growers freely substitute one buyer of fresh apples for another. Buyers of fresh apples have similar problems in that they handle the same product (apples) and perform the same function. Due to the large number of buyers, each

taking a relatively small part of the total volume, and due to the high degree of substitution among buyers, any one cannot make an independent price change because he either will lose all his suppliers by lowering price or will be flooded with supplies by increasing price. Again pure competition best describes the situation, although there are deviations from this concept.

Although processors and buyers of fresh apples are substitute outlets for apples, they are in different market sub-groups because they are confronted with different problems. Fresh apple buyers purchase for immediate sale without changing the form of the apple, whereas processors buy in a few weeks the amount that they sell over a period of a year or more. Processors also change the form of the fruit. The cost of apples is only a part of their total cost. Containers, manufacturing, storage, and other costs are all factors to be considered by processors. Processors depend on local apple supplies, and fresh apple buyers draw their supplies from all producing areas.

Processor buyers in the Appalachian Area are in a different market sub-group from processor buyers in other areas because the price paid by processors in one area does not affect significantly the supply offered to processors in other areas. Processors have their facilities located in specific areas and depend on local producers for their apple supplies. The net cost of marketing processed apple products is less if the apples are processed in the production area. Consequently, apples are processed near the point of production in order to reduce their weight, bulk, and perishability.

All processors in the Appalachian Area are in the same market sub-group because they are substitute buyers for apples and are confronted with similar production and marketing problems.

Unlike apple sellers and fresh apple buyers, competition among apple processors in the Appalachian Area does not fit the purely competitive situation. Six processors buy most of the apples processed in the Area. The two largest buy approximately one-half, a cooperative takes about one-sixth, and most of the remaining one-third is taken by three smaller firms. One of the three smaller firms operates much like a cooperative, and a second is integrated with the apple production operations of a large grower. The general practice is for one processor to announce a price and for all others to follow with a similar or an identical price. Therefore it appears that some form of imperfect competition best describes their competitive behavior. Under conditions of imperfect competition on the part of buyers, economic theory indicates a price lower than the price under conditions of pure competition (efficiency being the same under both conditions). However, several factors cause processor prices to tend toward the purely competitive price.

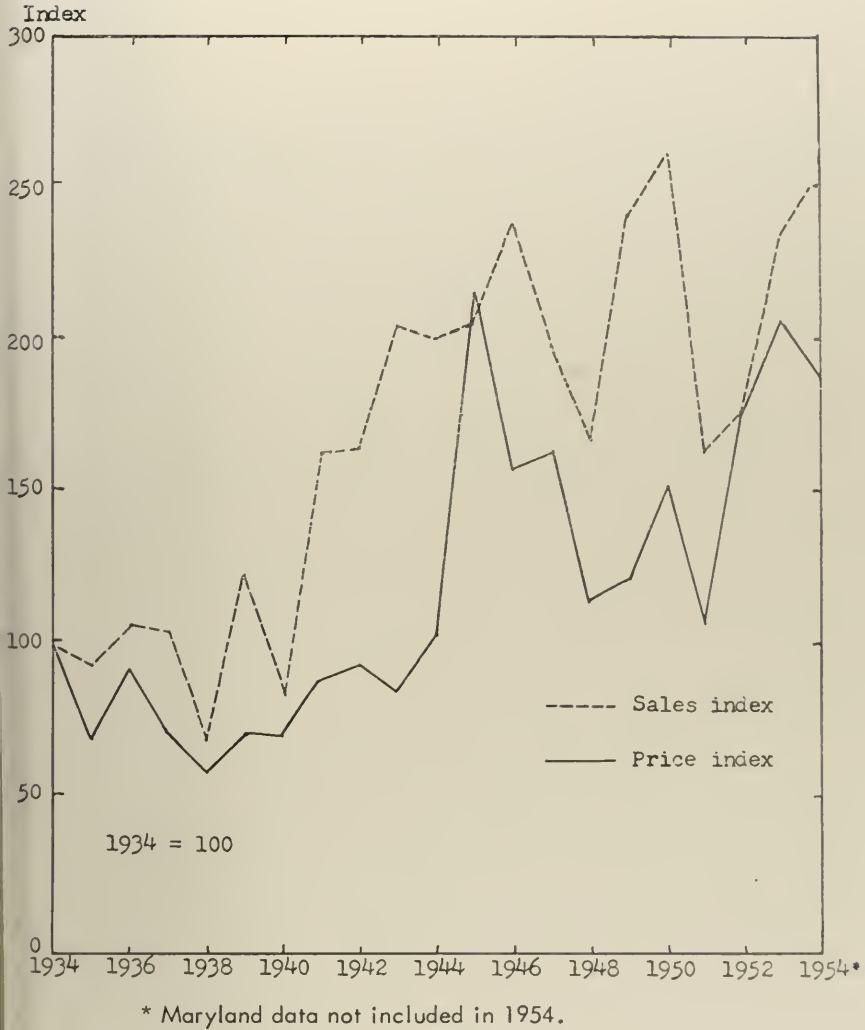
1. Fresh price appears to be established on a national basis under conditions approaching those of pure competition. The quantity of apples received by processors in the Appalachian Area is determined largely by the price of apples for processing relative to fresh apple prices. This is outside the control of processors. A rough approximation of this relationship is presented in Figure 5. The solid line represents an index of the ratio of processor prices to fresh prices in the Appalachian Area, and the broken line represents an index of processor purchases to fresh purchases. The two generally move together with sales tending to fluctuate more than price. This indicates that the supply confronting processors in the Appalachian Area is elastic.[3] The more elastic the supply curve the less the opportunity for excess profits. Therefore, the nature of the supply of apples available to processors rather restricts the opportunity for excess profits.

Also, processors buy on the basis of United States Grades and Standards. This facilitates the comparisons of offers by the different processors. In most cases each grower sells to more than one processor. Consequently, the supply available to any particular processor is dependent upon its price relative to other processors. Therefore, the supply available to any one processor is even more elastic than that for all processors in the area.

2. The cooperative processor returns all receipts over costs of operation to patrons on a patronage basis. A five cents per cwt. difference in price is enough to cause growers to switch sales from one processor to another. Under conditions such as these the non-cooperative processor cannot afford to ignore patronage refunds on the part of a cooperative even though such refunds are made after the crop has been marketed. Processors are concerned with their apple supplies and with the relative future growth of other processors. Consequently, other processors meet the competition of the cooperative's patronage refund by paying bonuses. These patronage refunds and bonuses increase the returns to apple growers.

Although the patronage refunds and bonuses are made after the growers have decided how to market their crops, they tend to become factors which are considered by growers in making marketing decisions because such payments have been made in the past and are expected to be made in the future. Thus, after patronage refunds and bonuses have become general practice, growers, when making marketing decisions, not only consider the announced price but also assume that something more will be paid. This consideration may explain partially why processors were deluged with apples in some recent years.

[3]The elasticity of demand or supply of a product is the: relative change in quantity ÷ corresponding relative change in price. For example, if a 1 per cent increase in price bring forth more than a 1 per cent increase in supply, the supply is elastic.



* Maryland data not included in 1954.

FIGURE 5. Indices of ratio of processor prices to fresh prices and of ratio of processor sales to fresh sales, Appalachian Area, 1934-54. (Source: Calculated from U.S.D.A. data.)

3. Implicit price deals, a second factor responsible for competitive pressure, are related closely to patronage refunds and bonuses. The announced price may not represent final settlement between growers and processors because allowances often are paid by processors for hauling, for storage, and for container costs. These allowances are employed when any processor is not getting all the apples he can use

at the price offered. Often they start as "secret deals" between individual growers and processors, but they fail to remain secret and soon become the general practice of all processors. These implicit price devices are employed for minor price adjustments in an effort by individual processors to attract apples from other processors. Such practices increase the growers' net returns and their sales to processors.

4. The ease of entry of new processing firms in a market sub-group influences the competitive behavior of the firms concerned. Both actual entry and potential entry appear to have moderating effects on the decisions of firms to maximize short-run profits. Existing processors tend to pay relatively higher apple prices in an attempt to combat the entry of new firms and to prevent their expansion after new firms have entered. Since 1939, three firms have entered successfully the sub-group of apple processors in the Appalachian Area.

5. Indications are that size of processing firms has little effect on the relative cost of processing apples. Also, costs for individual firms appear to be constant over their normal range of outputs. This indicates that one processor is about as efficient as any other processor. Such a situation maximizes the effectiveness of a cooperative and makes the entry of new firms relatively easy.

Conclusion

Competition among processors is strong and the price which they pay tends towards the purely competitive price. This means that processor price and output are efficient in the allocation of apples between the the fresh and processor outlets. It also indicates that in recent years the opportunity for excess profits among apple processors in the Appalachian Area has been reduced greatly if not eliminated.

Apple growers may help maintain this competitive market by: (1) being in a position to sell their apples through either the fresh or processor outlets and being on the alert to switch supplies to the outlet giving the highest net return; (2) keeping informed about the relative net returns from each processing firm and always being alert to switch supplies to the processor paying the highest net; and (3) supporting and maintaining a strong cooperative processor.

Editor's Note: All photographs courtesy of Appalachian Apple Service, Inc., and Area processors.