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QUANTITY, PRICE, AND VALUE INDEXES OF U.S. AGRICULTURAL TRADE

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Robert L. Tontz

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### ABSTRACT

In recent years, United States agricultural trade has been at its highest level in history whether measured by volume or value. This report updates and revises the quantity indexes of U.S. agricultural trade previously published through fiscal year 1977 in various USDA publications including mainly the <u>U.S. Foreign Agricultural Trade Statistical Reports</u>, supplements to the bi-monthly FATUS. Besides the quantity indexes, covering the years 1866 through 1979, the study introduces price and value indexes as additional measures of the U.S agricultural trade performance for 1978 and 1979. The report supersedes <u>Quantity Indexes of U.S. Agricultural Exports and Imports</u>, ERS Foreign 253, Economic Research Service, February, 1969. The revision and update also includes a methodology which may be computerized.

Key words: U.S. A

U.S. Agricultural trade; quantity, price, and value indexes; methodology; commodity classifications; statistical tables; graphs.

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### QUANTITY, PRICE, AND VALUE INDEXES OF UNITED STATES AGRICULTURAL TRADE

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### Robert L. Tontz\*

### Introduction

In recent years, United States agricultural trade has reached record high values. To understand the magnitude of these values, index measures are needed to determine the degree values are affected by quantity and price changes, particularly in view of price inflation.

This report reviews the course of U.S. agricultural trade indexes by providing historical highlights from the post-Civil war era to 1979; discussing various methodological aspects in the construction of the U.S. agricultural quantity, price, and value indexes; and presenting statistical reference tables and figures of the U.S. agricultural trade indexes from 1866 to 1979. 1/

### Agricultural Trade Highlights

### Export Quantity

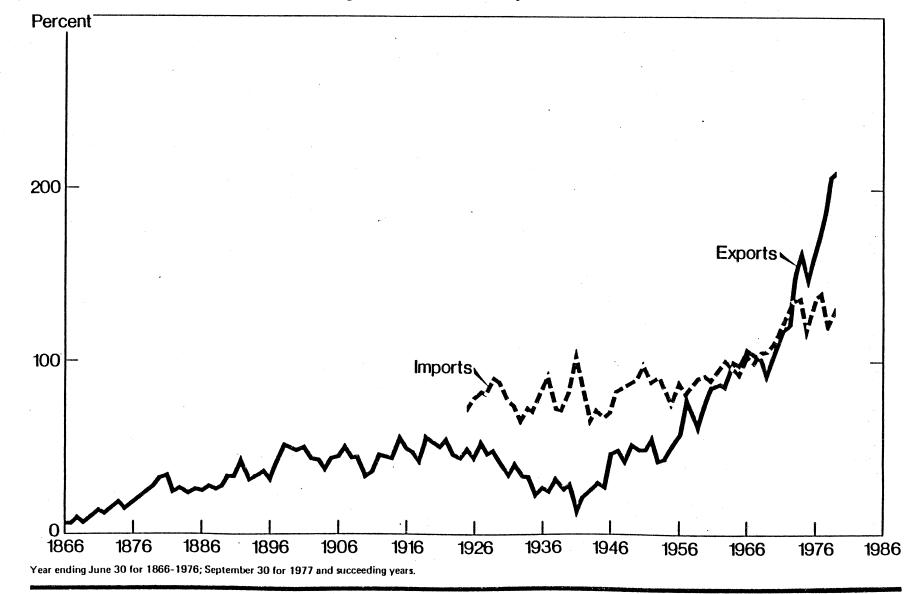
The quantity of U.S. agricultural commodities exported in fiscal year 1979 (year ending September 30) was the highest on record (Fig. 1); the volume index equaled 211 (1967=100) 2/. The current level of agricultural exports reflects the peak of a phenomenal trend, unequaled in magnitude of growth in the annals of U.S. agricultural trade history. This trend, which got underway during the early years of World War II, was stimulated by the adoption of lend-lease shipments, and exports resulting from the passage of Public Law (P.L.) 480, the Agricultural Trade Development and Assistance Act of 1954.

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1/ Besides the USDA reports on U.S. agricultural trade indexes, many long-standing, general statistical references provide useful information on index methodology. Typical examples may be found in John R. Riggleman and Ira N. Frisbee, <u>Business Statistics</u> (New York and London: McGraw Hill Book Co., Inc., 2nd ed., 1938), pp. xix, 790; John R. Stockton, <u>An</u> <u>Introduction to Business Statistics</u> (Boston: D.C. Heath and Company, 1938), pp. v, 378; Herbert Arkin and Raymond R. Colton, <u>Statistical</u> <u>Methods</u> (New York: Barnes and Noble, Inc., 4th. ed. revised, 1956), pp. xiv, 184, plus Appendixes; and I. Robert Parket, <u>Statistics for Business</u> Decision Making (New York: Random House, 1974), pp. xiv, 434.

2/ Unless otherwise stated all references to years are fiscal, which end June 30 from 1866 through 1976 and September 30 for succeeding years. The base period for the indexes is calendar year 1967.

## U.S. Agricultural Exports and Imports: Quantity Indexes (Calendar year 1967 = 100)



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Also in 1954, exports were further increased by the inauguration of a program of sales of agricultural commodities for foreign currency under the authority of an amendment to Public Law (P.L.) 165, the Mutual Security Act of 1951. 3/

The upward trend of agricultural exports that started during World War II represented the reversal of a downward trend that prevailed from the late 1920's to 1941, a decline brought on for the most part by the movement in Western Europe toward self-sufficiency and accompanying restrictions on trade.

Earlier, beginning near the turn of the century and continuing to the late 1920's, the U.S. export volume fluctuated but remained at a fairly constant level. The quantity index for farm product exports ranged from a low of 31 in 1910 to a high of 58 in 1919. A substantial portion of the increase from 1910 to 1919 reflected purchases due to World War I.

Still earlier, from the post-Civil War era to 1898, U.S. agricultural exports showed an upward trend stimulated by a steady and rapid expansion of agricultural production and increased industrialization in both the United States and abroad. During this period, the United States imported capital from Western Europe to develop the industries, railroads, and other infrastructure of the country. This capital was repaid in large part by shipments of agricultural commodities to Western Europe; European agricultural production remained stagnant.

Traditionally, the major U.S. agricultural exports have been wheat, feed grains, cotton, and tobacco. More recently, vegetable oils and oilseeds have become major export items, while animal products, fruits, and vegetables have sporadically been major items in years of surplus. \*Exports of food and feed grains have fluctuated greatly over the years due to factors such as self-sufficiency policies, drought, and war.

Exports of wheat and feed grains have shown sharp increases since World War II. In line with agricultural exports in general, exports of grains dropped sharply between the late 1920's and 1930's due to self-sufficiency policies in Europe. In addition, a prolonged U.S. drought resulted in the United States importing large quantities of wheat in the 1930's. Following the immediate expansion of U.S. exports to meet Europe's and Asia's postwar needs after World War II, U.S. wheat exports continued to increase substantially under P.L. 430. In addition, demand increased sharply for wheat and rice by developing countries such as India, Pakistan, the Philippines, Taiwan, Korea, Brazil, and other Asian, Latin American, and African countries.

<sup>3/</sup> Concessional Government program shipments from 1955 through September 1979 equaled 12 percent of the value of all U.S. agricultural exports. The concessional share was much higher from the middle 1950's to the late 1960's ranging from one-fifth to two-fifths of total export value.

Until World War II, many of these countries had been net exporters of grains. After the war, they became deficit countries as population expanded rapidly and food production lagged because of lack of innovations in agricultural practices. In the past decade alone, U.S. exports of grains and feeds have more than doubled in volume. Reduced harvests abroad, increased foreign demand for farm products resulting from higher incomes, and an improved U.S. competitive position aided by currency realignments were contributing factors to the rise in U.S. food and feed grain exports.

U.S. exports of cotton increased sharply after the Civil War, and continued their upward trend until the First World War. After the wartime decline, they rebounded and grew until the Great Depression. Low shipments of cotton during the World War II era were followed by an upward trend with wide fluctuations in face of increasing competition from abroad and greater use of synthetics. In recent years, the substantial rise in petroleum prices has made cotton more competitive with manmade fibers.

Tobacco exports trended upward after the Civil War, although yearly fluctations became wider with the start of World War I and the imposition of trade restrictions by major importing countries. Lack of foreign exchange resulted in policies that encouraged tobacco production in many other countries. For example, production increased sharply in Rhodesia after World War II when the United Kingdom encouraged production in the Commonwealth to reduce the dollar outflow for imports of U.S. tobacco. More recently, U.S. tobacco has faced increased competition from a number of additional developing countries that have expanded production. In addition, the European Community (EC), one of the more important outlets for U.S. tobacco exports, has followed a policy of encouraging production within the Community as well as the overseas areas that have trade preferences with the EC.

The United States was usually a net importer of vegetable oils until the late 1930's, but during World War II many important sources of supply were lost. Following the end of the war, exports increased sharply. Oilseed and oilseed product exports experienced a very rapid and pronounced expansion in the 1970's, largely as a result of increased exports of soybeans and soybean products. Factors contributing to the oilseed export gains were lower availabilities of foreign oils, high grain prices in the EC, and increased livestock production in both the EC and Japan.

U.S. exports of most animal products increased rapidly following World War II. These exports were often encouraged because of large domestic supplies; for example, in some years the exports of dairy products were largely under government-financed programs. However, the United States has maintained an upward trend in commercial exports of many animal products such as tallow, hides and skins, poultry meat, and variety meats. These products are in relatively large supply in the United States at attractive prices. European countries and other developing and industrial countries find these products an economic supplement to their own production of animal products.

Exports of fruits and vegetables generally increased until 1929. after which they fluctuated erratically until the post-World War II period. The sharp expansion in the immediate post World War II years reflected higher standards of living in Western Europe, Canada, and Japan and the improved foreign exchange position of leading importers which permitted the relaxation of import controls. The United States has been a substantial supplier of fruits and vegetables when production in other major consuming countries has been sharply reduced. Many of these countries, however, have increased their own production of fruits and vegetables, thereby reducing the need to import from the United States. For instance, production has increased substantially in Western European countries. Many U.S. food-processing companies have established foreign plants to avoid trade restrictions such as tariffs, quotas, and health and sanitary requirements, and to obtain a larger share of the market. In addition, many of the developing countries have emphasized production of fruits and vegetables to obtain larger amounts of foreign exchange to help finance their overall economic development plans. Even with these trade deterrents, U.S. exports of fruits and vegetables increased substantially during the past decade.

### Import Quantity

The volume of U.S. agricultural imports in fiscal year 1979 (year ending September 30) was near its highest level in history. The trend leading to the current high volume began in the early 1950's and lasted until the end of the Vietnam conflict in 1973. Since that time, large volume fluctuations have occurred. By 1979, the import quantity index was 132--only 6 percent below the all-time record of 140 (1967=100) in 1977.

The quantity rise in U.S. imports of agricultural commodities accelerated since the early 1950's. Yet the import increase, while pronounced, was much less, relatively, than the volume increase in U.S. agricultural exports. From the early 1950's to 1979, the volume rise for U.S. agricultural imports was 43 percent. During this same time, the gain in U.S. agricultural exports exceeded the volume of the early 1950's by 3.6 times.

The commodity composition of U.S. agricultural imports has changed over time. Declines, for example, have occurred for wool, and hides and skins. At the same time, there have been increases in meats and meat products, dairy products, and tobacco. Imports of grains and feeds increased to a postwar peak in 1953 but thereafter fell back to levels characteristic of nondrought and nonwar years.

Fluctuations have occurred in the imports of other commodities. Increased imports of animal and vegetable products raised the total imports of supplementary (partially competitive) items to 56 percent of the value of total agricultural imports in 1979, up from 44 percent in the 1950-54 period. Expanding incomes and demand for time-saving food preparations have encouraged imports of meats used in manufacturing prepared products, such as ready-to-cook hamburgers, luncheon meats, and ready-to-serve meat products. Imports of seasonal fresh fruits and vegetables were increased to provide the consumer with a year-round selection of many products which would not otherwise be available.

The volume index of supplementary agricultural commodities imported in 1979 equaled 150 (calendar year 1967=100); at the same time, the volume index of complementary (noncompetitive) agricultural imports stood at 110.

Supplementary imports include such commodities as cane sugar, meats, cattle, apparel wool (as distinguished from carpet wool), vegetable oils and oilbearing materials, tobacco, grains and feeds, fruits, nuts, vegetables, cotton, dairy products, and hides and skins. Complementary imports include mainly coffee, cocoa, bananas, rubber, spices, tea, drugs, and carpet wool.

In general, supplementary imports have tended to be attracted into the domestic market in times of relatively high domestic prices and discouraged when domestic prices were low relative to prices in exporting countries.

At 150 in 1979 (1967=100), the quantity indexes of supplementary agricultural import commodities hit record highs reflecting increases during the past decade of such major imports as meats, dairy products, vegetable oils, and tobacco.

Coffee was the highest valued import item in 1979 and accounted for over half the total value of complementary imports. In addition, cocoa and rubber contributed largely to the remaining complementary imports. The index of coffee, cocoa, and tea imports fluctuated in the last decade; however, the index of 99 in 1979 was about the same as a decade earlier.

Complementary imports increased at the outset of the Second World War in Europe as domestic stocks of coffee and rubber were built up in anticipation of wartime shortages. The quantity of complementary imports in 1941 reached one of the highest levels on record. The volume index in that year was 127 (calendar year 1967=100). In the next several years, the volume declined as customary sources of supply became inaccessible and as shipping was diverted to more urgent wartime needs.

Beginning with the post-World War II recovery, the quantity index of complementary imports reached 101 in 1948 and except for a decline to 83 in 1955 (reflecting, among other items, reduced coffee imports), the index remained relatively stable until the early 1970's. Since then, the quantity index of complementary imports ranged from 95 in 1975 to highs of 117 in 1973 and 1976 (Fig. 2).

The United States, like many other countries, regulates agricultural imports to keep out animal and plant pests and diseases, weeds, and adulterated foodstuffs, as well as to protect farm incomes. Import guotas or other restrictions also help to regulate the flow of

### U.S. Supplementary and Complementary Agricultural Imports: Quantity Indexes (Calendar year 1967 = 100)



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agricultural imports that might otherwise interfere with the stability of domestic farm prices, or upset the market for domestically produced goods. Under other statutes, nontariff restrictions may be imposed. Imports of ruminants, swine, and fresh, chilled, or frozen meats are prohibited from countries certified by the Secretary of Agriculture as not free of foot-and-mouth disease or rinderpest. Plant quarantine regulations restrict imports of plants or their products or soils that may carry plant pests into the United States.

### Export Price

Although quantities of U.S. agricultural commodities exported in 1978 and 1979 set new records, even larger price gains were registered since 1967. The 1979 agricultural export price index equaled 239 (calendar year 1967=100), 12 percent above the price index for the previous year. Higher prices, especially for such important export commodities as wheat, feed grains, cotton, tobacco, hides and skins, and fruits contributed to the higher price index for 1979 as compared with the price index for the previous year.

### Import Price

The rise in quantity of U.S. agricultural commodities imported since 1967 was relatively smaller than the quantity gain in U.S. agricultural commodities exported. With respect to prices, however, the reverse is true (Fig. 3). In the two years, 1978 and 1979, the price indexes of U.S. agricultural imports were 278 and 281, respectively, as compared to 213 and 239 for U.S. agricultural exports (table 1). The larger increases in the price indexes (relative to the quantity indexes), especially for imports, reflected inflated prices for such items as "coffee, cocoa, wool, and coconut meat.

### Export and Import Values

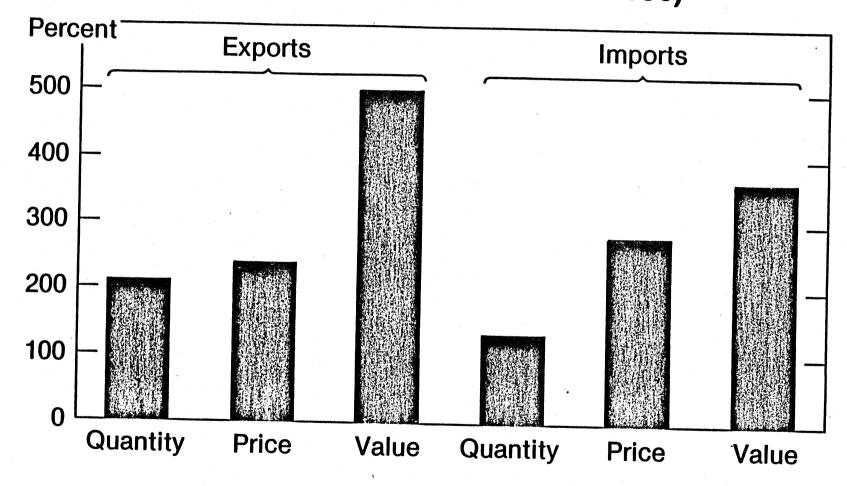
By 1979, the price rise for U.S. agricultural exports was 139 percent above its 1967 level, and the volume increase was 111 percent greater. These increases accounted for a substantial gain in value for U.S. agricultural exports in 1979 over the 1967 value. Actual value of U.S. agricultural exports in 1979 which equaled \$31.98 billion was 5 times the value for 1967. 4/

Agricultural imports also increased in value from 1967 to 1979, but the increase was relatively smaller than it was for U.S. agricultural exports. Amounting to \$16.18 billion in 1979, U.S. agricultural imports were over 3.5 times their value in 1967. Even though the rise in import prices was larger than for export prices, relatively smaller increases in quantities imported versus those exported caused the smaller gain in import value.

4/ The value index of U S. agricultural trade is the quotient of actual value(s) for a designated year(s) over the value for calendar year 1967.

Figure 3

# U.S. Agricultural Trade: Quantity, Price, and Value Indexes (Calendar Year 1967 = 100)\*



\*For year ending September 30, 1979.

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## Table 1--U.S. agricultural trade: Quantity, price, and value indexes, calendar and fiscal years 1978 and 1979

Item	: C.	alendar ye	ar	Fiscal year <u>1</u> /						
	Quantity :	Price	: Value <u>2</u> /	Quantity	Price	Value 2/				
	:	Cal	endar year 196	7 = 100						
Exports:	:									
1978 1979	: 212 : 225	221 253	461 545	204 211	213 239	428 501				
Imports:	: :									
1978 Supplementary	128 146	277 176	332 289	123 131	278 157	301 271				
Complementary	: 104	402	399	96	421	374				
1979 Supplementary	: 132 : 151	297 214	376 351	132 150	281 200	364 337				
Complementary		401	412	110	382	404				

 $\frac{1}{2}$  October 1-September 30.  $\frac{2}{2}$  Quotient of actual value for designated years over calendar year 1967 actual value.

### Nature of Update and Revision

This report presents the results of a revision and update of the quantity indexes for U.S. agricultural trade. Among other uses, a quantity index provides a comparative measure of magnitude of current U.S. agricultural trade quantitites with earlier periods. For maximum usefulness, indexes have to be revised from time to time. The revision and update are needed to make quantitative measures available, to incorporate additional commodities as they become important items of trade, to delete commodities that are no longer significant items of trade, and to adjust the commodity groupings.

### Method of Compilation

The new indexes, as well as the previous ones with which they are linked, were compiled by the weighted aggregative method expressed in the formula:

$$I = \frac{\Sigma \ Q_1 \ Po}{\Sigma \ Qo \ Po}$$

in which Q1 represents the number of units of each commodity exported or imported during the period for which the index number is computed; Po is the average value per unit of the respective commodity computed from quantity and value figures; and Qo is the average number of units of the respective commodity exported or imported in 1967.

### Base Period

The base period of the index is 1967, the standard base for all indexes in the U.S. Government. The calendar year base, 1967, is used for both the calendar year and the fiscal year index numbers so that the weighting of these two series is similar.

### Selection of Commodity Classifications

The export index was constructed from the agricultural commodities classification included in schedule B of the U.S. Bureau of Census, effective from 1967 through 1979. In all, the export index contained 46 principal commodity and commodity groups of agricultural schedule B codes. They accounted for 90 percent of all U.S. agricultural export trade in 1967. The index of agricultural imports was based on 36 major commodity and commodity groups in the Tariff Schedule of the United States Annotated (TSUSA) which accounted for 85 percent of all U.S. agricultural imports in 1967.

In selecting the commodities for inclusion in the index, an effort was made to obtain an abridged list of practical length without excluding any important items. Relatively important items were judged by dollar values during the base period and the availability of quantity statistics. Another criterion in choosing the commodities was the homogeneity of the Bureau of Census classification. An effort was made to avoid classifications that included large subclasses differing greatly in prices or in trade trends. The agricultural export indexes were broken down into several subindexes by major commodity groups. In the yearly series, separate subindexes were calculated for each of the groups shown in the tables.

Shipments under P.L. 480 and related laws, and under Public Law (P.L.) 195 (Act for International Development) are included in the export index.

In the import index, the commodity groupings were adjusted slightly to allow for changes in classification and to provide for a more logical combination of commodities according to their importance in the base period. The division of agricultural imports into supplementary and complementary commodities was continued from previous indexes. All agricultural commodities similar to those produced commercially in the United States and all others that are interchangeable in use to any significant extent with U.S. commodities were considered supplementary. The complementary group included all others, with coffee, cocoa, tea, rubber, crude drugs, wool for carpets, spices, and bananas accounting for 95 percent of the value of complementary products in the 1967 base period.

### Adjustment for Seasonal Variation

In a separate but related study, a methodology for determining seasonality was developed, relying principally on the arithmetic average adjusted for the trend in agricultural exports. 5/ A methodology similar to that used in previous index calculations could be used so that the average quantities for a designated base period could be computed by month for each commodity and commodity group and adjusted for seasonal variation. The indexes can also be adjusted independently using the X-11 Bureau of Census Method II Seasonal Adjustment Program.

### Linking with Old Series

The updated export indexes reflect the expansion in shipments of feed grains, wheat, soybeans, soybean products, and several other commodities that have become more important in export trade during recent years.

In this publication, the previously calculated export index numbers (1957-59=100) on a fiscal year basis are shown adjusted to the 1967 base and tied to the new index to show the trend of trade since 1866 (table 2). The previously calculated calendar year index of exports (1957-59=100) was also linked to the new calendar year index on the 1967 base and extended back to 1924 (table 3).

5/ See "Seasonal Indexes of U.S. Agricultural Exports," Foreign Agricultural Trade of the United States, U.S. Department of Agriculture, September/October, 1980, pp. 4-10, by Robert L. Tontz.

	:	:		Animal					:	: :	;	: :	· · · · · · · · · · · · · · · · · · ·
	: Total agricul- tural exports 2/	: •:Total : :	: : Dairy :products : <u>3</u> / :	:Poultry : and :poultry :products	: :Animal : fats : <u>3</u> /	:Meats and : meat :products : <u>3</u> /	: :Other : <u>3</u> / :	: and :linters :	:unmanu- :factured :	: and : : feeds: :	Vegetable oils and oilseeds	: and :W	egetable
	:				<u>_</u>	alendar ye	ar 196	7 = 100					
1866 1867 1868 1869 1870	: 7 : 7 : 8 : 8 : 10	12 14 16 13 16						33 33 40 33 49	31 35 30 31	2 2 3 3 4			
1871 1872 1873 1874 1875	: 14 13 16 19 16 :	21 33 48 47 43						72 45 59 69 62	36 38 35 53 36	4 6 8 7			
1876 1877 1878 1879 1880	: 18 : 20 : 24 : 29 : 32	45 62 78 93 99						74 72 79 81 90	36 46 46 53 36	.8 8 11 15 17			
1881 1882 - 1883 1884 1885	: 34 : 24 : 26 : 24 : 26	101 69 56 70 70				  		110 86 114 92 94	37 36 39 35 38	18 11 13 10 12	  		
1886 1887 1888 1889 1890	: 25 : 28 : 26 : 28 : 34	68 64 61 70 102						103 108 112 118 122	48 51 43 36 42	10 13 10 10 13			
1891 1892 1893 1894 1895	: 34 : 41 : 33 : 35 : 38	99 96 79 86 85						145 145 110 133 174	41 42 44 48 51	9 21 16 16 12			
1896 1897 1898 1899 1900	: 34 : 43 : 54 : 52 : 48	90 111 121 117 116						115 154 191 188 155	48 52 43 46 57	14 21 28 25 25			
1901 1902	: : 49 : 45 :	114 101		 				167 174	52 51	25 19			 

Table 2 -- U.S. agricultural exports: Quantity indexes of principal commodity groups, fiscal years 1866-1979

• 1

Continued-

	:	•			product	The second s		:	:			:	
Year <u>1</u> /	: : Total :agricul- : tural :exports : 2/	: :Total : :	: : Dairy :product: : <u>3</u> / :	s:poultry :products	: :Animal : fats : <u>3</u> /	:Meats and : meat :products : <u>3</u> /	:Other : <u>3</u> / :	: and :linters :	:unmanu- :factured :	Grains:		: and :	Uther Vegetable products
	:					Calendar	year	1967 =	100				
1903 1904 1905	: 43 : 38 : 43 :	82 96 94			 			177 154 214	61 52 55	19 12 8			
1906 1907 1908 1909 1910	: 45 : 48 : 43 : 41 : 31 :	113 93 84 66 45						178 224 188 222 160	52 56 54 47 59	15 15 14 10 9			
1911 1912 1913 1914 1915	: 37 : 45 : 43 : 42 : 55 :	51 58 51 48 73						200 273 226 237 217	58 63 68 74 57	9 8 14 12 31		12 13 17 12 17	
1916 1917 1918 1919 1920	: : 48 : 47 : 40 : 58 : 54	99 111 139 196 148						154 154 115 137 174	73 67 47 103 106	24 22 18 28 22		17 16 10 37 32	
1921 1922 1923 1924 1925	: 50 54 45 : 45 : 41 : 48 :	96 99 98 104 84						140 167 129 146 208	83 76 74 97 65	34 33 25 14 23		28 24 27 44 39	
1926 1927 1928 1929 1930	: : 42 : 54 : 45 : 47 : 39 :	61 57 57 50 51						204 285 200 214 381	87 82 83 98 103	13 19 19 18 13	2 2 2 2 2 2	44 56 51 69 46	
1931 1932 1933 1934 1935	: : 37 : 40 : 35 : 35 : 22 :	38 30 27 25 19						178 228 218 213 128	101 72 66 79 61	10 10 5 4 3	1 1 2 1 1	63 55 48 50 41	
1936 1937 1938 1939 1940	: 26 24 33 : 26 : 29	9 9 10 18 14						163 146 150 92 164	75 72 82 83 58	2 2 15 13 7	1 1 1 4	55 41 53 66 46	

Table 2-U.S. agricultural exports: Quantity indexes of principal commodity groups, fiscal years 1866-1975-Cont.

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	•	: <u></u>			product		_	:	:	: :		: :
	: : Total		:	: • D • • 1 •	:		:	:	: :	: :		: :
Year	agricul-		: • Dodam	:Poultry : and		:Meats and		:Cotton	:Tobacco	Grains:	Vegetable	:Fruits: Ot
<u>1</u> /	: tural				:Animal	: meat :products	:Other		:unmanu-	and :	oils and	: and :Vege
='	exports		: <u>3</u> /	: products	· 3/		<u>- 2</u>	: linters				: vege-:prod
	: 2/		· <u> </u>		': <i>2</i> '	: <u>3</u> /	:	•	:			:tables:
	:	-			·		•	•	<u> </u>			: :
	:					Calen	dar yea	ar 1967	= 100			
1941	: 12	18			·			32	31	6	2	23
1942	: 22	116	-					29	53	5	2	43
1943	: 25	151	-					32	54	4	5	36
1944	: 31	184						32	65	5	7	46
1945	: 30	136		-				42	84	7	6	57
1946	: 45	137						92	95	23	3	71
1947	: 46	87					-	<b>9</b> 9	106	32	4	73
1948	: 41	73	230	72	28	84	19	51	72	36	5	76
1949	: 52	66	216	22	47	53	20	119	79	41	14	48
1950	: 48	55	119	. 50	56	46	19	145	84	30	16	48
1951	: 48	65.	170	84	58	46	9	108	0/	<b></b>		
1952	: 54	56	86	52	80	55	10	108	84 91	37 42	18	48
1953	: 40	48	63	33	68	54	22	76	79	42 32	18	61
1954	: 42	68	142	34	73	63	39	94	80	25	14 23	60 62
1955	: 48	94	234	43	82	74	56	92	80	28	32	62 66
1956	: 56	116	205									
1957	: 77	116 109	305 232	51 62	100 92	91	63	56	101	41	43	79
1958	: 65	91	229	40	92 70	132 76	69 66	185	88	54	47	86
1959	: 62	83	164	69	76	73	58	143 79	83	45	46	89
	: 79	96	133	100	109	85	60	166	83 80	52 60	51 69	79 91
	:											21
1961	: 84	98	143	126	95	81	73	176	88	69	65	86
1962 1963	: 85 : 84	103	154	166	98	78	64	119	91	79	64 -	. <b>9</b> 3
1964	: 100	104 140	197 290	117 129	92	90	66	91	83	79	78	99
1965	: 98	130	240	125	127 117	122	84	128	93	94	82	<b>9</b> 2
1,01	:	100	240	114 ·	11/	118	94	113	84	92	99	95
1966	: 107	108	154	120	<b>9</b> 0	101		78	83	117	102	106
1967	: 104	101	99	105	96	106		115	110	103	95	106
1968	: 101	96	95	<b>9</b> 8	98	91	<u> </u>	101	100	104	99	91
1969	: 92	110	125	92	97	129	-	69	100	85	106	93
1970	: 106	101	<b>9</b> 0	83	99	113		75	101	97	148	109
1971	: 118	125	<b>9</b> 0	71	122	111		97	104	91	201	111
1972	: 120	149	172	95	111	130		88	100	88	201	115
1973	: 154	125	58	98	106	181		126	103	167	184	123
1974	: 165	130	39	110	110	179		152	121	179	189	136
1975	: 147	136	56	104	112	189		103	112	156	158	144
1976	: : 167	144	<b>4</b> 4 .	149	84	256		86	105	10/	105	16-
	: 160	153	56	201	104	256		92	105 75	184 198	195	161
1977	: 177	170	53	208	127	303		115	114	198	131	165 184
1978 5/		166	55	270	119	277		146	105	216	264	160
1979 5/		162	48	290	119	268		148	111	225	273	164

Table 2--U.S. agricultural exports: Quantity indexes of principal commodity groups, fiscal years 1866-1979-

Not available. 1/ Fiscal years July 1 - June 30 for 1866-1976; October 1 - September 30 for succeeding yea 2/ Based on 46 major commodities and commodity groups and includes 90 percent of total value of U.S. agricultural exports in 1976 for computation of revised indexes for 1978 and succeeding years. For earlier year indexes, the cal year 1967 base period included 359 classifications. 3/ Included in total "Animal products". 4/ Transition quarter July 1 to September 30, 1976. 5/ Preliminary. Table 3--U.S. agricultural exports: Quantity indexes of principal commodity groups, calendar years 1924-1979

	: : Total		:	Animal pr	oducts	:			:	:	:	: :	
Year	:exports	:	products 2/	:Poultry	:Animal : fats : <u>2</u> /	Meats and : meat	: other : <u>2</u> /	: linters		:Grains:	Vegetable oils and oilseeds	• • • •	Other Vegetable products
	:					- <u>Cale</u>	ndar y	ear 1967	- 100 -				No. of Contemporary Street,
1924 1925 1926 1927 1928	. 49 : 48 : 49 : 52 : 49 : 49	101 79 70 65 58						171 215 232 238 226	79 72 74 78 95	21 16 17 21 17	2 2 1 2 2	47 43 49 57 60	
1929 1930 1931 1932 1933	: 46 : 39 : 38 : 40 : 37 :	59 54 43 34 33						196 173 181 236 222	92 92 85 63 68	16 11 10 7 4	2 1 1 2 1	66 56 64 55 49	
1934 1935 1936 1937 1938	: 29 : 26 : 25 : 29 : 33 :	27 13 12 15 17						153 155 142 153 117	69 63 68 71 82	4 2 6 17	1 1 1 1 1	45 56 48 47 67	
1939 1940 1941 1942 1943	: 28 : 20 : 18 : 23 : 33	21 18 68 138 177						121 97 29 27 40	55 36 48 43 72	10 6 4 5	3 2 2 2 8	60 29 41 32 46	
1944 1945 1946 1947 1948	: 29 : 35 : 50 : 51 : 43	170 110 145 93 54	259 182	83 45	 30 23	172 54	 29 11	26 64 103 69 72	50 80 113 89 75	5 15 22 42 36	8 3 4 5 5	54. 63 73 86 66	96 105
1949 1950 1951 1952 1953	: 53 : 46 -: 54 : 46 : 41	64 61 63 48 61	170 140 142 57 102	27 85 67 38 37	62 54 70 74 74	49 43 51 55 63	24 13 8 16 30	131 145 129 103 72	87 84 92 69 91	40 25 42 39 29	18 16 20 15 17	44 53 52 62 60	90 58 47 36 49
.954 .955 .956 .957 .958	: 44 : 50 : 67 : 73 : 63	68 108 117 103 86	115 289 295 218 207	41 49 58 51 52	77 87 98 85 68	65 79 110 120 68	49 61 59 70 63	106 64 115 176 116	79 94 90 88 84	24 34 49 50 48	31 36 45 49 45	66 69 88 89 83	61 36 56 58 52
961 962 963	: 68 : 84 : 84 : 83 : 92	91 95 101 99 121	150 120 151 166 248	89 111 142 144 126	95 105 97 89 107	80 83 80 77 104	58 66 70 64 71	93 189 161 96 108	81 87 88 82 88	55 64 72 79 87	63 70 57 74 77	86 89 88 98 98	60 69 64 70 78
964 965 966 967 968	: 104 : 101 : 107 : 100	147 117 99 100 105	294 188 107 100 119	126 117 109 100 96	136 100 88 100 99	100	89 102 104 100 102	132 96 91 100 95	89 82 96 100 105	96 101 118 100 99	97 99 93 100 108	91 102 103 100 90	89 108 94 100 103
969 970 971 972 973	: 94 : 111 : 111 : 129	105 108 129 126 128	104 102 161 124 53	85 87 82 94 99	91 112 121 105 101	107 126 144	112 119 136	61 78 110 81 146	83 110	87 105 96 129 191	114 159 159 163 172	104 105 103 113 130	108 124 145
974 : 975 : 976 :	: 155 : 156 : 174 : 177	130 133 164 168 161	39 55 50 53 61	104 117 191 209 274	121 88 106 128 118	301		138 103 90 118 149	103 103 112	153 175 188 177 223	195 163 200 210 274	136 145 185 171 168	
:/ <u>3</u> /:	225	118	47	330	122	264		168		242	282	229	

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The changes in the index of agricultural imports were less pronounced than those in the export index. The importance of silk has declined since World War II with the introduction of nylon and other synthetics, as has the importance of natural rubber with the introduction of synthetic rubber, but the extent of these declines was accurately measured by the old index. The introduction of new products into agricultural imports has been relatively small, and, therefore, linking the old index to the new provides an accurate measure of the overall agricultural imports since 1924.

The previously calculated indexes of agricultural imports (1957-59=100) were linked to the revised and updated indexes on a fiscal and calendar year basis, with 1967 equal to 100 and extended back to 1924 and 1925, respectively (tables 4 and 5).

### Comparison with Previous Indexes

The U.S. agricultural export indexes from 1866 to date were compiled on a fiscal year basis, since foreign agricultural trade data prior to 1914 were available only on a fiscal year basis. Although calendar year numbers are available since 1914, the index was not constructed for calendar years earlier than 1924.

The fiscal year indexes of agricultural exports from 1866 through 1914 were based upon the volume of 29 major commodities in trade during the base period 1910-14. These 29 commodities accounted for 75 percent of the total volume of trade during 1910-14. In 1924, the index was recomputed from 1910 through 1924, using 44 commodities that accounted for about 90 percent of all exports and linked to the old index. These indexes were continued to 1940 but in 1941 were revised back to 1924, using calendar years 1924-29 as the base period and including 74 commodity classifications which accounted for 96 percent of the total trade in the new base period.

As a result of the declining importance during the 1930's of dairy products and several meat products, the 1941 revision did not show these groupings separately. Consequently, it was possible to show continuous trends in trade from 1866 to date for only the more important commodities such as cotton, grains, and tobacco. A continuous comparable series on exports of fruits and vegetables is available from 1909 to date and for exports of vegetable oils and oilseeds since 1924.

### Price Indexes

### Method of Compilation

Unlike the study, ERS FOREIGN 253 (February 1969), this report presents for the first time indexes of prices for U.S. agricultural exports and imports based on the same commodity classifications used for determining the quantity indexes. The agricultural export and import price highlights for recent years are summarized in the section of this report entitled "Agricultural Trade Highlights". Lable -- 0.3, agricultural imports: quantity indexes of principal commodity groups, fiscal years 1920-1979

Year <u>1</u> / 1925 1926	: Total : :agricul-: : tural : :imports : : 2/ : :	Total		Dairy :		Meats	: Wool,	Grains	: s:Vegetable	: Sugar, :molasse:	s:Tobacco	; ,:Tota	: l:Cocos.	: Rubber
1925 1926	:imports :			Dairy :										
1925 1926					aldes	and meat	:excluding	: and	:oils and	: and	:unmanu-	:	:coffee	,: and
1926 :	:		: :	products: 4/ :	and skins 4/		:free-in : bond 4/		:oilseeds	: sirups : 5/	facture	4:	and te	a:allied : gums
1926 :	•						alendar yes		= 100					<u> </u>
1926 :	: : 71	67		76	349		81	120	109	87	67	76		
	: 79	74		78	338		125	178	126	91	64	83		
	: 82	74		99	352		76	137	138	90	80	89		
	: 81	73	-	83	452		63	163	126	84	70	91		
	: 89	82		83	413		57	195	169	98	67	97		
1930	: 85	75		73	487		67	132	156	78	60	96		
	: 76	56	-	48	270		24	205	131	72	57	96		
	: 72	51		45	252 210		16	120	121	72 70	55	94		-
1934	: 64 : 74	44 55		42 34	328		7 30	83 200	107 147	64	43 33	82 92		
1935	: : 72	61		56	210		16	502	151	71	42	84		
	: 82	73		47	313		53	520	192	71	49	92		
1937	: 93	88		66	316		101	880	207	67	51	101		
	: 74	60		43	193		24	232	166	65	45	89		
1939	: 73	57		42	274		37	127	156	58	52	89	·	
1940	: 82	64		42	295		90	178	138	73	52	99		
1941 1942	: 104 : 82	78 78		19 27	402 449		263 313	188 188	124 131	79 56	55 53	1 27 87		
	: 63	91		30	398		723	351	58	43	63	38		
	: 71	93		18	270		392	1285	77	73	55	53	-	
1945	: : 68	79		4	221		306	712	71	80	58	58		
	: 69	70		14	182		450	195	56	46	57	72		
	: 82	73		20	205		368	63	109	64	68	92		
1948 1949	: 83 : 85	65 67	62 57	16 19	257 175		262 163	37 210	90 79	76 79	54 62	101 102	87 91	149 160
1950	: 87	74	67	33	234		233	329	90	73	62	100	86	157
1951 :	: 97 ·	86	85	46	257		298	366	108	81	68	109	95	174
	: 88	76	68	40	203		223	529	70	81	74	99	86	181
	: 92	83	73	52	203		228	593	· 78	85	73	101	89	155
1954	: 86 :	72 -	53	41	159		120	539	70	85	72	.99	91	137
	: 75	66	52	42	148		117	268	78	77	. 74	83	71	139
1956	: 88 : 81	71 65	53 46	42 44	175 144		123	246 278	73 72	92 85	77 80	104 96	95 89	133 123
1958	: 84	76	61	44	139		71	300	73	95	70	92	87	123
1959	: 91	84	79	51	197		100	200	74	97	83	99	92	119
1960	: 92 <sup>·</sup>	81	69	51	179		89	185	77	101	85	103	98	111
	: 88	75	64	58	141		77	168	78	87	88	101	103	83
	: .96	88	89	60	102		108	173	82	90	89	102	102	92
	: 100 : 96	95 88	101 91	61 62	141		124 86 .	1.10 215	87 81	99 78	85 83	106 105	105 106	95 85
	: : 90	85	<b>a</b> 1	62	144	71	124	124	93	97	01	95	92	99
	: 90 : 103	85 95	81 106	69	144	90	124	95	93	82 83	91 88	111	111	99 104
-	: 100	100	102	113	108	97	104	105	101	101	95	98	98	92
1968 :	: 105	105	108	94	121	107	115	92	97	102	111	104	104	107
1969	: 107	110	115	122	102	115	100	96	105	103	103	103	100	127
	. 111	116	121	116	82	128	81	131	104	107	103	104	101	131
	: 123 : 128	134 139	128	129	232 176	129 134	50 32	194 222	121 127	117	118 138	106 113	98 105	124 138
	: 136	149	126	121 155	178	145	31	260	138	113	138	117	111	136
1974	: 137	153	146	301	155	141	13	242	119	121	149	115	105	154
	: 116	131	108	128	145	117	12	243	134	102	171	95	93	140
1976 :	: 136	149	131	144	204	134	35	246	198	98	164	117	105	164
	: 135	154 163	130 133	152 172	132	138 125	35	244 255	196 186	122 113	167 162	108 107	90	168
1977 : 1978 7/ :		103	125	172	180 82	125	25		152	104	162	96	81	168
1979 7/ :		150	1 38	160	80	159	32	141	138	99	184	110	99	172

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years July 1-june ju 1925-76; ( 34 major commodities and commodity groups and includes 35 percent of total value of U.S. agricultural imports in 1967 for computation of revised indexes for 1978 and succeeding years. For earlier year indexes, the calendar year 1967 base period included 430 classifications. 3/ Supplementary agricultural imports consist of all imports similar to agricultural commod-ities produced commercially in the United States, together with all other agricultural imports interchangeable to any signif-:13Ca - 10 icant extent with such U.S. commodities. Complementary agricultural imports include all others and consist of rubber, coffee, tea, cocca beans, raw silk, wool for carpets, bananas, and vegetable fibers. 4/ Included in total "Animal products." Dairy products include cheese only for 1978 and 1979. 5/ Includes sugar only for 1978 and 1979. 6/ Transition quarter July 1 to September 30, 1976. 7/ Preliminary.

Table 5--U.S. agricultural imports: Quantity indexes of principal commodity groups, calendar years 1924-1979

	I Total I						entary <u>2</u> /	-				:	Complementary	2/
Year	<pre>s agricul- : t tural : t imports 1/: t</pre>	Total	: : : Total :	Dairy products 3/	imal produc i Hides i and i skins 3/	# Meats	: Wool, :ex.free /:in bong 3/ :	Grains and feeds	Vegetable oils and oilseeds	: Sugar, : molasses, : and : sirups 4/	Tobacco, unmanu- factured	Total	Cocoa, coffee, and tea	T Rubber T and T allied T gums
	1						Calendar year	1967 = 10	0					2
924	1 71	66		81	346		85	198	102					
25	1 77	72	•	80	377		110	156	115	82 91	54 59	75 83		
26	1 82 1 83	78 76		92	393		122	173	130	94	55	88		
28	1 83	74		87 84	439		89	146	125	86	73	90		
				04	472		63	178	128	80	56	92		
29 30	1 96 1 80	85		75	516		75	156	169	102	55	106		
31	1 80 1 78	67 55		60 49	415		56	215	139	75	49	94		
32	: 68	44		42	210		26 10	161 93	127	70	49	102		
33	1 72	54		36	359		26	166	136	68 68	35 36	90 89		
	1 69	53												
	1 84	71		36 58	230 316		21 31	302	113	69	37	84		
36	85	76		60	325		77	668 656	184	66	39	96		
	: 93	85		56	338		101	700	213	67 71	43	95		
38	1 72	54		42	210		21	78	143	67	41	100 89		
39	79	62		45	325		64	178	136					
	89	64		25	356		143	193	130	66 66	43 46	97		
41 42	107 64	91 79		19	564		384	239	145	80	40	113 123		
43	68	90		36 21	426 341		643	156	64	39	47	51		
	1			£1	341		587	820	67	64	48	47		
4	s 74 s 68	88		9	298		355	1356	70	74	48	59		
	1 68 1 80	73		11 21	205		432	371	63	63	49	64		
- · · · · · · · · · · · · · · · · · · ·	1 81	66	56	9	226 187		516 273	105	72	51	53	85		
	: 87	69	72	20	234	16	266	37	97 90	85	59 53	95	82	156
	1 1 84	65	53	24	185					00		104	90	162
	1 90	80	77	42	277	13 21	172 264	293 324	81 102	78	53	102	95	145
	: 89	80	77	40	218	28	280	459	82	78 77	55 63	101	83	177
	: 90	80	71	49	177	28	243	620	74	83	61	99 102	89	162
53	1 89 1	77	60	47	184	32	167	583	73	85	61	100	88 92	177 144
4	1 77	67	50	39	139	33	111	361	73	81	61			
	: 82 : 84	68 67	54	42	154	31	123	220	73	88	63	87 95	77 85	133
	1 84 1 82	69	48 50	43 42	167	28	106	280	73	90	68	99	93	143 129
58	1 86	81	72	48	152	30 55	79 79	298 241	74	87	69	96	90	124
59	t 1 95							241	1	101	77	91	86	106
	1 95 1 89	82 79	76 64	53	203	62	103	193	76	96	83	107	99	127
5 <b>1</b>	·	82	76	52 60	157 149	51	79 89	161	79	102	86	98	96	92
	1 100	92	97	60	148	87	120	180 124	82 85	89	89	102	102	87
	8 99	93	99	61	151	97	108	137	79	92 94	86 86	107 105	107 105	94 85
4	93	84	81	63	152	76	94	215						0)
5 .	95	89	93	60	141	77	149	100	84 87	76 82	83	102	101	98
66 67	100	99 100	107	93	130	96	145	100	99	91 ·	91 91	101 102	99 101	99
58	112	111	100 116	100	100 126	100 113	100	100	100	100	100	100	100	95 100
-					120	113	119	93	103	106	111	113	114	120
9		109	114	109	86	119	86	109	105	102	103	99	95	130
1	•	117	113	126	84 74	131 129	67	138	104	111	107	99	95	122
2	118	126	125	134	44	144	40 23	129 153	110	113	121	108	105	135
3	121	130	125	162	30	143 -	16	101	131 129	113 112	117 132	106	102 107	134
4	115	125	112	199	24	120					132	103	107	141
5	123	134	115	126	179	120 124	9 18	131	107	123	146	101	96	149
6		156	135	158	179	135	39	229 233	167 194	88 105	168	107	100	149
		165 146	134	168	184	126	40	254	166	128	168 161	114 101	103 82	158 173
79	132	151	134 134	160 164	81	148	36	99	154	84	170	101	87	163
			1.54	104	77	156	27	141	143	104	191	108	97	164

-- = Not available, 1/ Based on 34 major commodities and commodity groups and includes 85 percent of total value of U.S. agricultural imports in 1967 for computation of revised indexes for 1978 and succeeding years. For earlier year indexes, the calendar year 1967 base period includes 430 classifications. 2/ Supplementary agricultural imports consist of all imports similar to agricultural commodities produced commercially in the United States, together with all other agri-cultural imports interchangeable to any significant extent with such U.S. commodities. Complementary agricultural imports include all others and consist of rubber, coffee, tea, cacao beans, raw ailk, wool for carpets, bananas, and vegetable fibers. 3/ Included in total "Animal products." Dairy products include cheese only for 1978 and 1979.

Price indexes are useful in providing a comparative measure of magnitude of current U.S. agricultural trade prices with those of previous periods and in assessing rates of price change. Indexes of agricultural trade prices were computed by the weighted aggregative method expressed in the formula:

$$L = \frac{\Sigma Q_0 P_i}{\Sigma Q_0 P_0}$$

in which Pl is the average value per unit of each commodity exported or imported during the period for which the index number is computed; Qo is the average quantity of the respective commodity exported or imported; and Po is the average value per unit of the respective commodity exported or imported in 1967.

### Other Similarities

Besides using the weighted aggregative method of computation for the price indexes as was used for the quantity indexes, there were other similarities in computing the quantity and price indexes. These included the choice of the same base period and the use of identical commodity classifications. In addition, when applicable, the same adjustments for seasonal variation and linking with old series apply for the quantity and price indexes.

