U. S. AIR FORCE

# PROJECT RAND

## RESEARCH MEMORANDUM

A COMPARISON OF SOVIET AND UNITED STATES
RETAIL FOOD PRICES FOR 1950

E. S. Wainstein

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The purpose of this study is to compare Soviet and United States retail food prices for 1950. Of the 37 individual foods considered, the relatively lowest priced food in Moscow was carrots, for which the Russians paid 4 rubles for a quantity costing a dollar here, while the highest priced food was lard, for which the Russians paid 91 rubles for a quantity costing a dollar here. The average of these widely varying individual price ratios turns out to be 25 rubles to the dollar or 18 rubles to the dollar, depending on whether United States or Soviet weights are used. In terms of retail food purchasing power, the ruble was therefore worth from 4 to $5\frac{1}{2}$ cents in 1950.

It should be noted that these price comparisons are not applicable to any year except 1950. In the years since 1950, American food prices have increased while Soviet food prices have fallen. Thus the average ruble-dollar price ratio for food commodities would be lower in the years since 1950 than it was in 1950.

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# A COMPARISON OF SOVIET AND UNITED STATES RETAIL FOOD PRICES FOR 1950

Eleanor S. Wainstein

## I. Introduction[1/]

The purpose of this study is to compare Soviet and United States retail food prices for 1950. The study is part of a larger project the purposes of which are: (1) to deflate the various components of Soviet and United States national product accounts and (2) to analyze differences in ruble-dollar price ratios for various commodities and commodity classifications. For these purposes we need both individual ruble-dollar price ratios for comparable commodities and an average ruble-dollar ratio.

In obtaining ruble-dollar relationships, it is clear that no single purchasing power parity need apply to the various components of national income. Therefore, in comparisons of ruble and dollar values, each sector of the economy must be considered separately. The comparison of consumers' goods prices is being approached by two studies: the present study, involving food items only, and a forthcoming study which will consider non-food consumers' goods.

Two principal sources have been used to obtain the food prices. Moscow food prices for 1948 are presented in: Janet Chapman, Retail Food Prices in the USSR, 1937-1948, RAND RM-707-1 (hereinafter referred to as Chapman). By the use of officially stated price changes, 1950 prices are obtained from the 1948 prices. In addition to data obtained in this way, some prices originate from unpublished reports by visitors to Moscow.

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1/ I am indebted for assistance in organizing this study, as well as for the bulk of the data on Soviet prices and for the data on Soviet weights, to Mrs. Janet Chapman of the RAND Corporation. Miss Helen Humes and Mr. Bruno A. Ochiro of the Bureau of Labor Statistics were extremely helpful in providing material on US food prices and pricing policies. I am grateful to Miss Alice Hirsch of the RAND Corporation for checking my statistical computations.

average first quarter dollar prices are listed for comparative purposes because of the rapid rise in the general price level after the middle of the year. The ruble prices are Moscow prices in state stores for the ten-month period, March-December, 1950. Official price reductions on March 1, 1950 affected most food items, but no further general price reductions occurred until March, 1951.

Considerable effort was devoted to matching the commodities priced in the US and USSR. The procedure used was to go through BLS, Food Prices and then through Chapman to determine whether similar items were priced. In Chapman, sixty-five food items are priced and described in detail. With the aid of BLS, Food Manual the descriptions of the commodities priced in each country were compared. If the descriptions showed the commodities to be comparable, the 1948 Moscow price in Chapman was adjusted to a post-March 1, 1950 price by reference to officially stated price changes between 1948 and 1950.

In some cases, the US descriptions were not sufficiently detailed and required further information. For example, in the case of flour, Soviet wheat flour is classified by percentage of wheat extraction. After inquiries, it was ascertained from the US Food and Drug Administration that white wheat flour is of 70-72 per cent extraction. Accordingly, Soviet flour of 72 per cent extraction was included as the comparable commodity. Other such cases are noted in Appendix A.

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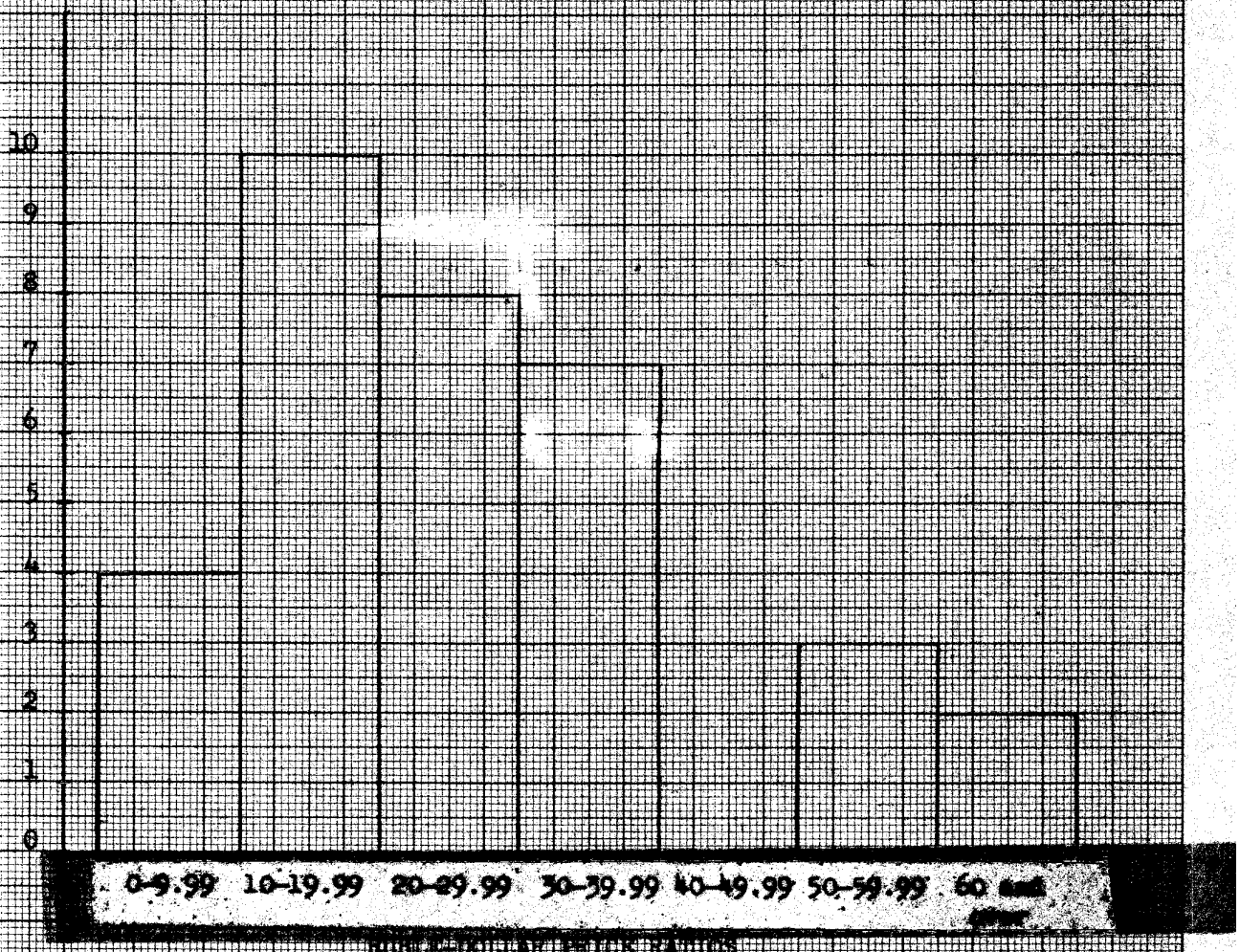
CHART I: DISTRIBUTION OF RUBLE-DOLLAR PRICE RATIOS FOR 37 FOOD ITEMS




Source: Table 1.

For some commodities in BLS, Food Prices but not in Chapman, there were 1936 prices available in an official Soviet price handbook.4/ By the application of the 1936-1948 percentage price change in the USSR for a similar commodity, a presumably comparable 1948 Soviet price was estimated.

In some instances, the BLS priced an item which is not the same as but which is similar to an item priced in the USSR. In Moscow, for example, canned apricots have been priced frequently, while in this country canned peaches are priced by BLS. Here, the author priced both items in current prices in a group of Washington, D.C. grocery stores and obtained a ratio between them. This ratio was then applied to the 1950 US price for canned peaches to arrive at an estimated 1950 US price for canned apricots which is assumed to be comparable to the Moscow canned apricots price. Other such cases are noted in Appendix A.

To supplement the price data in Chapman, reference was made to recent visitor reports from Moscow, a rich source of retail price quotations. Although the quality descriptions of food products in these reports are not always detailed, they were matched as closely as possible with BLS items.

Control by the state of Soviet retail prices facilitated the data-gathering task in one important respect. Since post-war retail price changes have been widely publicized and published in considerable detail in the Soviet press, a 1950 price can be derived from a quotation reported from 1948 to 1953. Official decrees listing percentage changes in retail

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4/ Sbornik otpusknykh i roznichnykh tsen i torgovykh nakidok na prodovol' stvennye tovary (Handbook of Wholesale and Retail Prices and Trade Margins on Food Commodities), Leningrad, 1936.

prices in March, 1949 and March, 1950 were used to adjust 1948 prices from Chapman.[5/] It should be noted, however, that this procedure is not without error for some of the reported price changes used as adjustment factors for particular prices are average price changes for more aggregative commodity groups.

As we have noted, the Soviet food prices in Table 1 are Moscow state store prices which are set by the government. In comparison with the US retail market, the Soviet retail market as represented by state stores is relatively tight even in the best of times. In general, goods are less readily obtainable than in the US. To obtain otherwise unobtainable commodities, to avoid queues, to obtain quality merchandise, Moscow residents supplement their purchases from state stores with food purchases in collective farm markets to which food is brought from farms for sale. At the collective farm market, prices fluctuate in accordance with supply and demand. To the degree that supplies in state stores are inadequate at state prices, collective farm market prices exceed state store prices. What evidence there is for 1950, including visitors' qualitative reports, suggests that the Soviet retail market was relatively easy in that year – i.e., that collective farm market prices were generally not far out of line with state store prices. If this is true, inclusion of collective farm market prices in the present study would not make much difference in the results.

Table 2 presents scattered data on 1950 collective farm market prices from unpublished reports by Moscow visitors. For purposes of comparison, 1950 state store prices are repeated in Table 2. However, the comparisons suggested should be regarded with reservations because detailed commodity descriptions in the case of collective farm market prices are not available.

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5/ The relevant percentage changes reported are presented in Table A1, p. 18.

TABLE 2: COLLECTIVE FARM MARKET PRICES FOR FOOD, [redacted]

OCTOBER–NOVEMBER, 1950

| Commodity | Units | 1950 State Store Price (Rubles) | 1950 Collective Farm Market Price (Rubles) |
|---|---|---|---|
| | (1) | (2) | (3) |
| Rice | kg. | 13.54 | 15.00 |
| Pork chops | kg. | 32.83 | 25.00 |
| Lamb | kg. | 22.03 | 25.00 |
| Chicken | kg. | 23.94 | 27.00 |
| Butter | kg. | 41.58 | 40.00 |
| Milk, fresh | kg. | 3.60 | 3.76--4.50 |
| Eggs, fresh | ten | 10.00--14.00 | 12.00-16.00 |
| Apples, fresh | kg. | 8.00--24.00 | 10.00 |
| Cabbage, fresh | kg. | .94 | 1.00--1.50 |
| Carrots, fresh | kg. | .60--1.28 | 2.00 |
| Onions | kg. | 2.00--3.50 | 2.00--3.00 |
| Potatoes | kg. | .90 | 1.00--2.00 |
| Beans, dried | kg. | 7.63 | 11.50 |

[redacted]

Sources:

State store prices from Appendix A, pp. 18–30.
Collective farm market prices from unpublished reports by visitors to Moscow.

Some of the differences observed may be due to quality differences. With respect to the commodities for which state store prices but no collective farm market prices are stated, it is known that canned goods, fats and oils, and beverages are not sold in the collective farm markets. In the other cases, no collective farm market prices are available, though the commodities presumably are traded.

III. Weights

Three sets of weights are more or less readily available for use in the construction of an index of ruble-dollar food prices. The "relative importance" of individual food items in the US food price index was calculated in BLS, Food Prices. These relative importance figures are "percentage distributions of the values of the individual foods in the index as of a certain date". 6/ In the particular set of relative importance figures used here, each component figure is apparently obtained as the product of a 1947-1949 expenditure figure and a price relative that measures the change in price from 1947-1949 to December 1950. 7/ Thus, the weights implied by the relative importance figures for each commodity are, essentially, the product of average 1947-1949 quantity consumed and December, 1950 price expressed as the percentage of a similar total for all commodities. It is necessary, however, to redistribute some of the "relative importance" weights because some items included in BLS, Food Prices are excluded from the present study. The original "relative importance" figures as compiled by the BLS, the redistributions undertaken here, and the final set of US weights are presented in Appendix B, Table B1.

Two sets of weights, based on Soviet food consumption patterns, were compiled by Janet Chapman for her studies of Soviet retail price changes. The Soviet weights for 1928 are based on a detailed Soviet study of the 1927-1928 budgets of about 600 urban households in eight industrial regions of the USSR.

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6/ BLS, Food Prices, p. 31.

7/ BLS, Food Prices, pp. 31-32, 33. The set of relative importance figures used is that obtained by BLS for the interim adjustment of the food price index. The underlying expenditure figures are based on expenditure surveys conducted by BLS and the Department of Agriculture and on other data.

Both sets of Soviet weights embrace a larger number of commodities than are included in the present study. This again necessitates a redistribution of the relative weights to correspond to the commodities included. The original 1928 and 1937 weights compiled by Chapman, the redistributions undertaken here, and the final sets of Soviet weights are presented in Appendix B, Table B2.

IV. Results

In the construction of an index of ruble-dollar food prices, the appropriate formula depends, of course, upon the purpose of construction. As Appendix C indicates, the purpose of deflating US-USSR components of national product accounts calls for Paasche and Laspeyres index numbers, i.e. index numbers of the form:

$$\frac{\sum P_1 W}{\sum P_o W} \qquad (1)$$

where $P_1$ and $P_o$ represent USSR and US prices, respectively, and W represents alternative associated sets of USSR and US quantity weights.

The absence of the necessary quantity data forces the construction of index numbers which utilize price ratios weighted alternatively by USSR and US value (price times quantity) weights. That is to say, when US weights are used, the index computed is:

$$\frac{\sum \frac{P_1}{P_o} V_o}{\sum V_o} \qquad (2)$$

where $P_1$ and $P_o$ represent USSR and US prices, respectively, and $V_o$ represents US value (price times quantity) weights. When USSR weights are used, the index computed is:

$$\frac{\sum V_1}{\sum \frac{P_o}{P_1} V_1} \qquad (3)$$

where $P_1$ and $P_o$ have the same meaning as previously and $V_1$ represents USSR value (price times quantity) weights. It is easy to state algebraically conditions which are sufficient to establish that formulae (2) and (3) are reducible to Paasche and Laspeyres index numbers, but evidence on the truth of these conditions is absent. On the other hand, the equivalence of

formulae (2) and (3) to the Laspeyres and Paasche formulae, respectively, can be obtained as an inference from the observed behavior of various index numbers computed with alternative sets of weights. It is on this basis, as set forth in Appendix C, that index numbers (2) and (3) are computed here and are regarded as equivalent to the required Laspeyres and Paasche index numbers.

The results of these calculations are presented in Table 3. Three alternative weighting systems and two alternative sets of US 1950 prices are involved in Table 3. For the proper interpretation of Table 3, it should be re-emphasized: (a) that index number formula (2) was computed when US weights were used and index number formula (3) was computed when USSR weights were used; and (b) that the results with alternative sets of weights are regarded by inference as equivalent to Laspeyres and Paasche index numbers. Thus, the index of ruble-dollar food prices (with average annual US prices) is about 25 rubles per dollar with US weights and about 18 rubles per dollar with USSR weights. The use of first quarter rather than average annual US prices increases the indexes of food prices by 1.3 – 7.3 per cent in dependence upon the weights employed.

The food price indexes in Table 3 refer to state store ruble prices only. Without additional data it is difficult to assess the influence of inclusion of collective farm market prices on the indexes. As Table 2 suggests, some collective farm market prices are significantly below their counterparts in state stores and others are very much higher. Ignorance of quality differences and of seasonal variations in collective farm market prices serve further to confuse the issue. I would tend to assume that the food price indexes in Table 3 would be inappreciably affected by inclusion of 1950 collective farm

TABLE 3: INDEX NUMBERS OF RUBLE-DOLLAR FOOD PRICES, 1950

| Weights and Prices Used | Index Number of Food Prices (In Rubles Per Dollar) |
|---|---|
| 1. US Weights | |
| a. Average Annual US Prices | 25.27 |
| b. Average First Quarter US Prices | 27.11 |
| 2. USSR 1937 Weights | |
| a. Average Annual US Prices | 18.08 |
| b. Average First Quarter US Prices | 18.32 |
| 3. USSR 1928 Weights | |
| a. Average Annual US Prices | 18.21 |
| b. Average First Quarter US Prices | 18.67 |

Sources:

Individual ruble-dollar ratios from Table 1, columns (5) and (6);
US weights from Appendix Table B1, column (3);
USSR weights from Appendix Table B2, columns (6) and (9).

market prices. The grounds for this belief are: (1) that, on the basis of visitors' reports, collective farm market prices seemed generally not far out of line with state store prices; (2) that a number of commodities included in the present study – canned goods, fats and oils, beverages – are not traded in the collective farm market; and (3) that whatever overall ratio of collective farm market to state store prices exists should be weighted by a factor of something like .3 to represent the proportion of total Moscow food sales accounted for by collective farm markets. 8/

It should be noted, finally, that the indexes of 1950 food prices obtained here are not applicable to later years. Annual decreases in Soviet food prices occurred in 1951–1954 with appreciable decreases in each year except 1954. In 1951–1954, the BLS food price index has been 11–13 per cent higher than in 1950. Thus, the 1950 average ruble–dollar ratios obtained here would be larger than similar ratios for later years.

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8/ Charles Madge, "Notes on the Standard of Living in Moscow, April, 1952", Soviet Studies, January 1953, p. 231. It is stated here that in April, 1952, about 30 percent of Moscow's food was purchased in the collective farm markets.

# APPENDIX A: RETAIL FOOD PRICES, MOSCOW AND US CITIES, 1950

The principal source used for Moscow food prices is: Janet G. Chapman, Retail Food Prices in the USSR, 1937-1948, RAND RM-707-1 (hereinafter referred to as Chapman). The 1948 food prices contained therein are converted to 1950 prices by means of officially stated precentage price decreases which are presented in Table A1. Additional 1950 price quotations are obtained, as indicated below, from unpublished reports by visitors to Moscow.

The principal source used for 1950 United States urban food prices is Bureau of Labor Statistics, Retail Prices of Food 1950, Bulletin No. 1055. The commodity specifications are contained in Bureau of Labor Statistics, Food Manual, Specifications for Foods, Cleaning Supplies and Sundries, Section 400, Revised January 2, 1952. Except where otherwise indicated all US commodity prices and specifications are obtained from these Bureau of Labor Statistics documents. In some instances, specifically noted below, supplementary data are obtained from: (a) unpublished price materials generously made available by individual employees of the Bureau of Labor Statistics and from (b) spot investigations undertaken by the author.

Before discussion of detailed prices and commodity specifications, the following general explanations of the Soviet prices should be made. (a) The prices listed are state store prices in Moscow. Prices in cooperative stores are generally the same as prices in state stores; but even where this is not so, cooperative store prices are largely irrelevant to the present study because cooperative stores operate predominantly in rural areas. On the other hand, Moscow residents do purchase in collective farm markets at prices which in general are not the same as prices in state

stores. Scattered data on collective farm market prices are presented in Table 2 p. 8 above. (b) The 1950 prices listed, unless otherwise noted, are prices prevailing after the price reductions of March 1, 1950. (c) All references below to adjustments of 1948 prices in order to obtain 1950 prices are to the use of the percentage price decreases presented in Table A1. The dates of the price reductions are March 1, 1949 and March 1, 1950: no general price reductions occurred between December 1947 and March 1949 or between March 1, 1950 and March 1, 1951.

Detailed prices, commodity specifications, and methods follow by individual commodities as itemized in Table 1.

## I. CEREALS AND BAKERY PRODUCTS

### 1. Wheat Flour

US: General, all-purpose flour, made from either hard or soft wheat or a blend of the two. The US Administration of Food and Drugs reports that US wheat flour is of 70-72 per cent extraction. Average annual price: 49.1 cents per 5 lbs. or 21.5 cents per kg. Average first quarter price: 48.4 cents per 5 lbs. or 21.3 cents per kg.

[redacted]

USSR: Wheat flour of 72 per cent extraction. Chapman, p. 51 uses the 1948 price of 8.00 rubles (R.) per kg. Price adjusted to 1950: 5.04 R. per kg. Unpublished sources quote a price of average quality flour at the end of 1950 as 5.00 R. per kg.

In the USSR the customary practice is to use more of the outer portion of the wheat kernel for flour than is used in the US, i.e., flour of 85 per cent extraction. Therefore, the flour priced here

is not the type most used in the USSR. Visitor reports from Moscow in late 1949 indicate, however, that very little flour of any type was available on the market except on the two big holidays of the year when everybody was allotted a small ration. Consequently, city residents depend almost entirely upon bakeries for their bread. (Lydia Kirk, Postmarked Moscow, p. 50.)

2. Corn Meal

US: Corn meal, white or yellow. Average annual price: 9.0 cents per lb. or 19.8 cents per kg. Average first quarter price: 8.4 cents per lb. or 18.5 cents per kg.

USSR: There is no 1948 or 1950 price available in the sources used. A 1936 price from an official price handbook is available, however, and 1936 and 1948 prices for millet grits and buckwheat grits are used to estimate the 1948 corn meal price as follows:

| | 1936 | 1948 | 1948/1936 Price Ratio |
|---|---|---|---|
| Corn meal | 1.30 | -- | -- |
| Millet grits | 2.10 | 6.00 | 2.857 |
| Buckwheat grits | 4.30 | 12.00 | 2.791 |

(The 1936 prices are from: Sbornik Otpusknykh i Roznichnykh Tsen i Torgovykh Nakidok Na Prodovol'Stvennye Tovary, Lenningrad, 1936, p. 26. Hereinafter this source will be referred to as Sbornik. The 1948 prices are from Chapman, p. 55.) The average 1948/1936 ratio of 2.824 is applied to the 1936 price, yielding 3.67 R. per kg. for corn meal in 1948. Price adjusted to 1950: 2.64 R. per kg.

3. Rice

US: Polished rice, whole, short grain. Average annual price: 16.8 cents per lb. or 37.0 cents per kg. Average first quarter price: 16.4 cents per lb. or 36.2 cents per kg.

USSR: Rice is 17.10 R. per kg in 1948 (Chapman, p. 55) and 13.54 R. per kg. as adjusted to 1950.

4. Rolled Oats

US: Rolled oats or oatmeal. Average annual price: 16.2 cents per 20 oz. package or 28.7 cents per kg. Average first quarter price: 16.1 cents per 20 oz. package or 28.4 cents per kg.

USSR: Unpublished material quotes a price for "Hercules" rolled oats in a box at 7.35 R. per kg. in state stores, January 1949. By adjustment for price changes after January 1949 the 1950 price is 5.62 R. per kg.

5. White Bread

US: Pan style bread, prepared from white flour. US Administration of Food and Drugs reports that 72 per cent extraction flour is used, and water content of bread is approximately 36.5 per cent. Average annual price: 14.3 cents per lb. or 31.5 cents per kg. Average first quarter price: 14.0 cents per lb. or 30.9 cents per kg.

USSR: Wheat bread of 72 per cent extraction flour. Price in 1948 of 7.00 R. per kg. (Chapman, p. 53) is adjusted to a 1950 price of 4.41 R. per kg.

The water content of US bread is 36.5 per cent while that of the Soviet bread is 43-44 per cent (V. P. Van'kevich, Khlebobulochnie tovary: posobie dlia prodstsov, 1948, p. 33). Since the Russian bread has 11 per cent less wheat content than the US bread, the price of 4.41 R. is attributed to 890 grams of US bread. Accordingly, a 1950 price of 4.96 R. per kg. of wheat bread is used.

II. MEAT, POULTRY, AND FISH

6. Beef

US: Rib roast from rib section of forequarter, behind chuck, before loin and above plate. This cut is used to represent all beef in the US. Average annual price: 74.3 cents per lb. or 163.8 cents per kg. Average first quarter price: 68.6 cents per lb. or 151.2 cents per kg.

USSR: Bacon, Average fed beef, first grade cuts, is 30.00 R. per kg. in 1948 (Chapman, p. 58). According to diagrams of grades of beef, first grade cuts include rib roast from rib section of forequarter, which is the US cut priced (Sbornik, p. 278).

Visitors' reports indicate that the Soviet "above average fed" beef would correspond to the US cuts. A 1948 price for "above average fed" beef, first grade cuts, is obtained on the assumption that the ratio between prices of "above average fed" and "average fed" beef is the same in 1948 and in 1936. Thus, 1936 prices of "above average fed" and "average fed" beef are, respectively, 8.60 R. per kg. (Sbornik, p. 267) and 7.60 R. per kg. (Chapman, p. 58). By the application of the ratio between these two prices, i.e. 1.1316, to the 1948 price of 30.00 R. per kg. for "average fed" beef (Chapman, p. 58), a 1948 price of 33.95 R. per kg. is obtained for "above average fed" beef and is adjusted to a 1950 price of 23.22 R. per kg.

7. Pork

US: Pork chops, cut from center of loins. Average annual price: 75.4 cents per lb. or 166.2 cents per kg. Average first quarter price: 65.8 cents per lb. or 145.1 cents per kg.

USSR: A May 1949 price of 58.00 R. per kg. for salted sow belly is furnished by unpublished material. This is adjusted to a 1950 price of 43.50 R. per kg.

11. Lamb

US: Lamb, hind leg, short cut, US choice. Average annual price: 74.4 cents per lb. or 164.0 cents per kg. Average first quarter price: 69.1 cents per lb. or 152.3 cents per kg.

USSR: Above average fed mutton of first grade cut is priced at 34.00 R. per kg. in 1948 (Chapman, p. 59). According to diagrams of cuts (Sbornik, p. 280) first grade cuts include the hind leg, which is that cut priced by BLS. The 1948 price is adjusted to a 1950 price of 22.03 R. per kg.

12. Chicken

US: Frying chickens, New York dressed, only feathers off, not drawn. Average annual price: 46.1 cents per lb. or 101.6 cents per kg. Average first quarter price: 42.1 cents per lb. or 92.8 cents per kg.

USSR: Chicken, grade I, is priced at 35.00 R. per kg. in 1948 (Chapman, p. 60). Unpublished sources report that chicken is sold either alive or dead, not drawn or feathered. The 1948 price adjusted for changes through 1950 yields a price of 23.94 R. per kg.

13. Perch, Fresh Frozen

US: No average price is published for fresh fish, but from unpublished material monthly average prices for fresh frozen perch are available for March through December 1950. The US prices are obtained on the assumption that the March price was in effect for the first three months of 1950. Average annual price: 41.5 cents per lb. or 91.5 cents per kg. Average first quarter price: 40.4 cents per lb or 89.1 cents per kg.

USSR: Pike perch, fresh frozen, is chosen to represent all fish in the USSR, since it is a common fish food and, according to encyclopedic definitions, closely resembles the fish of the perch family in North America. Pike perch is 12.0 R. per kg. in 1948 (Chapman, p. 66). By adjustment for changes through March 1950, the 1950 price is 9.70 R. per kg.

14. Butter

US: Salted creamery butter, 92 score. Average annual price: 72.9 cents per lb. or 160.7 cents per kg. Average first quarter price: 73.2 cents per lb. or 161.4 cents per kg.

USSR: Chapman, p. 73, lists two 1948 salted butter prices: salted extra at 68.00 R. per kg., and salted, highest grade, at 64.00 R. per kg. Because no further description of Soviet butter is available for comparison with the US product an average of the two butter prices is used (66.00 R. per kg.) and adjusted to a 1950 price of 41.58 R. per kg.

15. Cheese

US: American cheddar, processed. The Food and Drug Administration reports that US standard cheese is 43 per cent fat content. Average annual price: 51.8 cents per lb. or 114.2 cents per kg. Average first quarter price: 52.1 cents per lb. or 114.9 cents per kg.

USSR: A 1948 price is not available for a cheese of similar type in the USSR. A 1936 price for processed Soviet American-cheese, highest grade, 45 per cent fat content, is 20.20 R. per kg. (Sbornik, pp. 483-4). By applying the price increase from 1937 to 1948 for swiss cheese (Chapman, p. 74 -- from 24.80 to 72.00 R.

USSR: Condensed milk with sugar is reported in unpublished material to cost 6.80 R. for a 410 gram can in 1950. This is reported from two stores. The price for 500 grams is 8.29 R.

IV. EGGS

18. Eggs, Fresh

US: Fresh eggs, grade A or volume selling. Average annual price: 60.4 cents per dozen or 50.3 cents per ten eggs. Average first quarter price: 50.7 cents per dozen or 42.3 cents per ten eggs.

USSR: Table eggs, of the first category, average 16.00 R. for ten eggs in 1948 (Chapman, p. 76). By adjustment, the corresponding 1950 price is 13.60 R. for ten eggs. Other 1950 quotations from unpublished material range from 10.00 to 14.00 R. for ten eggs.

V. FRUITS AND VEGETABLES

19. Apples, Fresh

US: Apples, fresh, volume selling type. Average annual price: 12.0 cents per lb. or 26.5 cents per kg. Average first quarter price: 10.0 cents per lb. or 22.0 cents per kg.

USSR: First grade apples are priced at approximately 20.50 R. per kg. in 1948 (Chapman, p. 83). The price is a midpoint of a range of prices existing throughout the year. By adjustment for price changes in 1949 and 1950, the 1950 price is 16.40 R. per kg. Other quotations by visitors to Moscow in 1950 range from 8.00 to 24.00 R. per kg.

20. Cabbage, Fresh

US: Cabbage, Danish, domestic, or pointed type with standard trim, grade 1. Average annual price: 5.9 cents per lb. or 13.0 cents per kg. Average first quarter price: 6.6 cents per lb. or 14.6 cents per kg.

USSR: Fresh cabbage prices for a range of months throughout the year 1950 are available in unpublished reports, although no distinction of grade or type is given. The average of these prices is .94 R. per kg.

21. Carrots, Fresh

US: Carrots, bunched or topped, grade I. Per bunch, average annual price is 10.0 cents and average first quarter price is 10.1 cents. The author visited various supermarkets in the Washington, D.C., area, weighed bunches of carrots and found them to average 1 lb. Accordingly, average annual price is taken to be 22.0 cents per kg. and average first quarter price 22.3 cents per kg.

USSR: As reported by Moscow visitors at various times of the year, 1950 carrot prices range from .60 R. per kg. to 1.28 R. per kg. A midpoint of the range, .94 R. per kg., is used as the 1950 price.

22. Lettuce

US: Head lettuce, all varieties. Per head, average annual price is 13.9 cents and average first quarter price 15.1 cents. The author weighed heads of lettuce at numerous grocery stores in Washington, D.C., and found the weight to average 1.125 lbs. per head. Accordingly, average annual price is taken to be 27.3 cents per kg. and average first quarter price 29.5 cents per kg.

USSR: Lettuce appears to be available in Moscow only during the season. Only one price quotation is available from unpublished material with no description given. The price is 3.00 R. per kg.

23. Onions, Fresh

US: Common, yellow, dry cooking onions, globe type. Average annual price: 6.8 cents per lb. or 15.0 cents per kg. Average first quarter price: 7.3 cents per lb. or 16.1 cents per kg.

USSR: Onions are available all year in Moscow, averaging 2.00 R. per kg. in summer and 3.50 R. per kg. in winter (from unpublished material for 1950). The midpoint of the two, 2.75 R. per kg., is used here.

24. Potatoes

US: Old potatoes, volume selling year round. Average annual price: 69.2 cents per 15 lbs. or 10.2 cents per kg. Average first quarter price: 70.7 cents per 15 lbs. or 10.4 cents per kg.

USSR: Old potatoes are 1.00 R. per kg. in 1948 and .90 R. per kg. in 1950 (Chapman, p. 77). Visitors' quotations during 1950 confirm the .90 R. price

25. Tomatoes, Fresh

US: Fresh tomatoes, sliceable. Average annual price: 24.3 cents per lb. or 53.6 cents per kg. Average first quarter price: 23.5 cents per lb. or 51.8 cents per kg.

USSR: Tomatoes are available only during the season in Moscow. Two unpublished reports for 1950 quote tomato prices in Moscow: one, a range of 2.00 R. to 5.00 R. per kg.; another, a summer average of 3.00 R. per kg. The summer average of 3.00 R. per kg. is used here.

26. Apricots, Canned

US: Canned apricots, priced frequently by Moscow visitors, are not priced by BLS, but canned yellow cling peaches are priced. Therefore, both fruits were priced in a variety of stores in Washington, D.C., and the price of apricots by weight was found to be 118.0 per cent of the price of the same amount of canned peaches. Accrodingly, the price of canned apricots in 1950 is estimated as follows:

| | Unit | Average Annual Price | Average First Quarter Price |
|---|---|---|---|
| Canned Peaches | 2-1/2 can (1 lb. 13 oz.) | 28.7 cents | 27.0 cents |
| Canned Peaches | Kilogram | 34.9 cents | 32.8 cents |
| Canned Apricots | Kilogram | 41.2 cents | 38.7 cents |

USSR: Canned apricots in 1948 are 17.50 R. per kg. (Chapman, [redacted] p. 84). Adjusted to 1950, the corresponding price is 12.25 R. per kg. Other price quotations from unpublished material are 17.13 R. and 19.25 R. per kg. An average of the three prices, 16.21 R. per kg., is used.

27. Peas, Canned

US: Sweet or sugar peas, canned. Average annual price: 20.5 cents per No. 2 can (1 lb., 4 oz.) or 36.2 cents per kg. Average first quarter price: 18.6 cents per No. 2 can or 32.8 cents per kg.

USSR: Canned green peas are priced at 9.10 R. for 500 grams in 1948 (Chapman, p. 83). By adjustment, the corresponding 1950 price is 7.28 R. for 500 grams, or 14.56 R. per kg. Unpublished reports for 1950 quote prices at 12.06 R. per kg. and 8.29 R. per kg. An average of the three prices, 11.64 per kg., is used here.

28. Tomatoes, Canned

US: Small and large piece tomatoes, canned. Average annual price: 14.7 cents per No. 2 can (1 lb., 4 oz.) or 26.0 cents per kg. Average first quarter price: 14.2 cents per No. 2 can or 25.1 cents per kg.

USSR: A 510 gram jar of tomatoes is priced by a Moscow visitor at 6.35 R. in October 1950 (from unpublished material) or 12.45 R. per kg. No other quotations are available.

29. Prunes, Dried

US: Dried prunes. Average annual price: 24.6 cents per lb. or 54.2 cents per kg. Average first quarter price: 23.8 cents per lb. or 52.2 cents per kg.

USSR: Dried prunes are priced at 40 R. per kg. in 1948 (Chapman, p. 85). By adjustment for changes in 1949 and 1950, the 1950 price is 32.00 R. per kg. An unpublished source quotes a price of 28.00 R. per kg. for dried prunes in 1950. A midpoint of the two prices, 30.00 R. per kg., is used.

30. Beans, Dried

US: Dried beans, white pea, are priced by BLS. These are not strictly comparable with the red and white beans priced in the USSR; however, the author priced both kidney and pea bean in a variety of grocery stores in Washington, D.C., and found that on the average, they were the same price per pound. Accordingly, it is assumed that the 1950 prices for the two commodities are identical. Average annual price: 15.3 cents per lb. or 33.7 cents per kg. Average first quarter price: 15.0 cents per lb. or 33.1 cents per kg.

USSR: Kidney beans, red and white mixed have an average 1948 price of 10.60 R. per kg. (Chapman, p. 56). By adjustment, the corresponding 1950 price is 7.63 R. per kg.

VI. BEVERAGES

31. Coffee

US: Coffee, whole bean or ground roasted coffee, can or bag. Average annual price: 79.4 cents per lb. or 175.0 cents per kg. Average first quarter price: 76.5 cents per lb. or 168.7 cents per kg.

USSR: Coffee beans, roasted, first grade, are priced at 75.00 R. per kg. throughout 1948 (Chapman, p. 88). There were no price adjustments in 1949 and 1950 and the same price is reported in October 1950 (from unpublished material).

32. Tea

US: Black tea is not priced in all the cities in which BLS agents regularly report, and no average US price is reported. However, March 1950 prices are available for eight US cities, and the average of these is 31.5 cents for 1/4 lb. of black tea. If the 31.5 cents per 1/4 lb. (or 27.8 cents per 100 grams) is used to represent a first quarter price and if the ratio of the first quarter to the annual average coffee price is used to estimate an annual average tea price, the result is a price for tea of 28.9 cents per 100 grams.

USSR: Georgian, black tea is 16.00 R. per 100 grams throughout 1948 (Chapman, p. 87). By adjustment, the 1950 price is 14.40 R. per 100 grams.

## VII. FATS AND OILS

33. Lard

US: Pure lard, steam rendered, open kettle rendered, or leaf. Average annual price: 19.1 cents per lb. or 42.1 cents per kg. Average first quarter price: 16.6 cents per lb. or 36.6 cents per kg.

USSR: Hog lard "extra" is priced at 52.00 R. per kg. in February 1949, which when adjusted for a 1950 price change indicates a 1950 price of 42.64 R. per kg. "Average" lard is reported (from unpublished material) at 34.30 R. per kg. in 1950. An average of the two is used -- 38.47 R. per kg.

34. Salad Oil

US: A shortening similar to sunflower oil, the type commonly used and priced in theSoviet Union, is not priced by BLS. However, hydrogenated shortening is priced. The author, therefore, priced hydrogenated shortening and liquid vegetable oil shortening (the type most nearly resembling the sunflower oil) in a variety of grocery stores in Washington, D.C., and found the latter to be 8.8 per cent higher in price than the former. Accrodingly, 1950 prices for liquid shortening are estimated as follows:

| | Unit | 1954 Price | Average Annual 1950 Price | First Quarter 1950 Price |
|---|---|---|---|---|
| Hydrogenated Shortening | 1 lb. | 33.0 cents | 32.8 cents | 30.5 cents |
| Salad Oil | 16 fl. oz. | 39.0 cents | | |
| Salad Oil | 1 lb. | 35.9 cents | | |
| Hydrogenated Oil | 1 kg. | | 72.3 cents | 67.2 cents |
| Salad Oil | 1 kg. | | 78.5 cents | 73.0 cents |

It should be noted that, according to the Department of Agriculture, 1 gallon of salad oil equals 8.71 lbs.

USSR: Sunflour oil, liquid shortening, is priced at 30.00 R. per kg. throughout 1948 (Chapman, p. 73). By adjustment, the 1950 price is 27.00 R. per kg.

35. Mayonnaise

US: Cooked salad dressing is priced by BLS, but mayonnaise, which is more common in the USSR, is not. Accordingly, a mayonnaise price is estimated for 1950 by applying a ratio of 1954 prices to the 1950 price for salad dressing. In a survey of prices in a variety of Washington stores, the average salad dressing price was found to be 81.7 per cent of the average mayonnaise price. Thus:

| | Unit | Average Annual 1950 Price | First Quarter 1950 Price |
|---|---|---|---|
| Salad dressing | 1 pint (1 lb.) | 34.7 cents | 33.4 cents |
| Salad dressing | 1 kg. | 76.5 cents | 73.6 cents |
| Mayonnaise | 1 kg. | 93.5 cents | 90.0 cents |

It should be noted that, the US Department of Agriculture reports that 1 pint of mayonnaise weights 1 lb. net.

USSR: Mayonnaise is priced in 1950 at 5.90 R. for a 225 gram bottle (unpublished material). This is 26.22 R. per kg.

36. Margarine

US: Uncolored margarine. Average annual price: 30.8 cents per lb. or 67.9 cents per kg. Average first quarter price: 28.3 cents per lb. or 62.4 cents per kg.

USSR: Margarine, table, is 33.00 R. per kg. in 1948 (Chapman, p. 74). By adjustment, the 1950 price is 21.45 R. per kg. This closely resembles another quotation for 1950 of 21.40 R. per kg. (from unpublished material).

37. Sugar

US: Granulated cane or beet sugar. Average annual price: 48.7 cents per 5 lbs. or 21.4 cents per kg. Average first quarter price: 48.0 cents per 5 lbs. or 21.2 cents per kg.

USSR: Granulated sugar is 13.50 R. per kg. throughout 1948 (Chapman, p. 70). By adjustment, the 1950 price is 11.48 R. per kg.

## APPENDIX B: DERIVATION OF US AND USSR WEIGHTS

In order to obtain an average ruble-dollar ratio for food, the individual food price ratios are weighted alternatively by US and USSR weights. The purpose of the present appendix is to explain the derivation of weights.

The basic set of US weights used is the Bureau of Labor Statistics compilation of 1950 "relative importance" for individual food products which are presented in column (1) of Table B1. Some "relative importance" figures, however, refer to commodities for which no price is included in the present study. In these cases, the BLS "relative importance" figure is redistributed to other related commodities, as indicated in column (2) of Table B1. The result of this procedure is a final set of weights, presented in column (3) of Table B1, which differ somewhat from the BLS "relative importance" figures.

Two basic sets of Soviet weights are employed—a 1928 and a 1937 pattern of urban expenditures. Both sets of weights were constructed by Janet Chapman in connection with her studies of Soviet retail price changes. The 1937 commodity weights used are a revised set of those listed in her food price study (Chapman, pp. 34–36). The 1928 weights have not previously been published in commodity detail. Because of the absence of exact correspondence between the Chapman and present studies in commodity coverage, it is necessary for present purposes to redistribute some of the commodity weights constructed by Chapman. Accordingly, Table B2 presents: (1) the basic sets of weights constructed by Chapman (columns (1) and (2)); (2) the redistributions employed (column (3)); and (3) the final revised weights (columns (4)–(9)).

| Commodities & Commodity Groups | BLS "Relative Importance" (Percentage of Total) (1) | Redistributions of "Relative Importance" Figures (2) | Final Weights (Percentage of Total) (3) |
|---|---|---|---|
| Cereals & Bakery Products | 11.12 | - | 11.12 |
| Flour, wheat | 1.68 | - | 2.24 |
| Corn Flakes | .43 | Proportionately, to all other cereals & bakery products | - |
| Corn meal | .12 | - | .16 |
| Rice | .22 | - | .29 |
| Rolled oats | .23 | - | .31 |
| Bread, white | 6.10 | - | 8.12 |
| Vanilla cookies | 2.34 | Proportionately, to all other cereals & bakery products | - |
| Meats, Poultry & Fish | 33.07 | - | 33.07 |
| Round steak | 4.40 | To rib roast | - |
| Rib roast of beef | 1.38 | - | 15.28 |
| Chuck roast | 1.88 | To rib roast | - |
| Frankfurters | 2.85 | To rib roast | - |
| Hamburger | 3.75 | To rib roast | - |
| Veal, cutlets | 1.02 | To rib roast | - |
| Pork chops | 2.98 | - | 2.98 |
| Bacon | 1.56 | - | 1.56 |
| Ham | 1.90 | - | 1.90 |
| Salt pork | .28 | - | .28 |
| Leg lamb | 2.39 | - | 2.39 |
| Chicken, frying | 5.66 | - | 5.66 |
| Fish (fresh frozen) | 1.92 | - | 3.02 |
| Salmon, pink (canned) | 1.10 | To fresh frozen fish | - |
| Dairy Products | 17.44 | - | 17.44 |
| Butter | 2.41 | - | 2.65 |
| Cheese | 1.57 | - | 1.73 |
| Milk, fresh | 11.00 | - | 12.10 |
| Ice cream | 1.59 | Proportionately, to all other dairy products | - |
| Milk, evap. (or condensed) | .87 | - | .96 |
| Eggs, fresh | 6.39 | - | 6.39 |
| Fruits & Vegetables | 19.10 | - | 19.10 |
| Frozen fruits & vegetables | .74 | Proportionately, to all fresh fruits & vegetables | - |
| Apples, fresh | .82 | - | 4.58 |
| Bananas, fresh | 1.44 | To apples | - |
| Oranges, fresh | 2.06 | To apples | - |
| Beans, green | 1.06 | Proportionately, to all fresh vegetables | - |
| Cabbage | .41 | - | .53 |
| Carrots | .74 | - | .95 |
| Lettuce | 1.10 | - | 1.41 |
| Onions | .55 | - | .71 |
| Potatoes | 1.91 | - | 2.45 |
| Sweet potatoes | .31 | Proportionately, to all fresh vegetables | - |
| Tomatoes | 1.83 | - | 2.34 |
| Canned peaches (apricots) | .96 | - | 1.85 |
| Canned pineapple | .69 | To canned peaches | - |
| Canned corn | 1.00 | Proportionately, to canned tomatoes & peas | - |
| Canned peas | .85 | - | 1.36 |
| Canned tomatoes | 1.30 | - | 2.16 |
| Canned baby foods | .67 | Proportionately, to all canned vegetables & fruits | - |
| Dried prunes | .26 | - | .29 |
| Dried beans | .42 | - | .47 |
| Beverages | 7.02 | - | 7.02 |
| Coffee | 5.32 | - | 5.32 |
| Cola drinks | 1.70 | To tea | - |
| Tea | - | - | 1.70 |
| Fats and Oils | 2.93 | - | 2.93 |
| Lard | .42 | - | .42 |
| Hydrogenated shortening | 1.08 | - | 1.08 |
| Salad dressing | .74 | - | .74 |
| Margarine | .69 | - | .69 |
| Sugar & Sweets | 2.93 | - | 2.93 |
| Sugar | 2.08 | - | 2.93 |
| Grape jelly | .85 | To sugar | - |
| All Food Commodities | 100.00 | | 100.00 |

Source: "Relative importance" figures in column (1) from Bureau of Labor Statistics, Retail Prices of Food, 1950, Bulletin 1055, p. 35.

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TABLE B2: ESTIMATED FOOD EXPENDITURES PATTERNS, USSR, 1928 AND 1937

| Group, Subgroup, and Commodity | (1) Group and Commodity Weights Compiled by Chapman 1928 (Percentage) | (2) Group and Commodity Weights Compiled by Chapman 1937 (Percentage) | (3) Redistributions of Chapman Weights | (4) 1928 Revised Group Weights (Percentage of Total) | (5) 1928 Revised Commodity Weights (Percentage of Group) | (6) = (4) • (5) 1928 Revised Commodity Weights (Percentage of Total) | (7) 1937 Revised Group Weights (Percentage of Total) | (8) 1937 Revised Commodity Weights (Percentage of Group) | (9) = (7) • (8) 1937 Revised Commodity Weights (Percentage of Total) |
|---|---|---|---|---|---|---|---|---|---|
| I. Grain Products and Legumes | 24.2 | 32.5 | | 26.21 | | | 37.02 | | |
| A. Rye Flour[a] | 6.3 | 2.7 | To C.2 | | | | | | |
| B. Rye Bread[a] | 10.9 | 24.4 | To D.2 | | | | | | |
| C. Wheat Flour | | | | | | | | | |
| 1. Wt. Flour, 85%[a] | 19.9 | 3.0 | To C.2 | | | | | | |
| 2. Wt. Flour, 72% | 19.9 | 3.0 | | | 47.4 | 12.42 | | 12.5 | 4.63 |
| D. Wheat Bread | | | | | | | | | |
| 1. Wt. Bread, 85%[a] | 17.1 | 48.8 | To D.2 | | | | | | |
| 2. Wt. Bread, 72% | 16.7 | 5.5 | | | 44.3 | 11.61 | | 80.1 | 29.62 |
| 3. French Loaf, 72%[a] | 0.4 | 1.4 | To D.2 | | | | | | |
| E. Macaroni, etc. Products[a] | 2.1 | 3.8 | To C.2 | | | | | | |
| F. Grits, Rice and Legumes: | | | | | | | | | |
| 1. Buckwheat Grits[a] | 2.1 | 2.2 | To F.5 | | | | | | |
| 2. Millet Grits[a] | 2.1 | 3.6 | To F.6 | | | | | | |
| 3. Rice | 2.1 | 1.4 | | | 2.1 | .55 | | 1.4 | .52 |
| 4. Dried Beans | 2.1 | 0.3 | | | 2.1 | .55 | | 0.3 | .11 |
| 5. Corn Meal[b] | - | - | | | 2.1 | .55 | | 2.2 | .81 |
| 6. Rolled Oats[b] | - | - | | | 2.1 | .55 | | 3.6 | 1.33 |
| II. Meat and Poultry | 20.4 | 9.4 | | 22.01 | | | 10.71 | | |
| A. Pork | 12.9 | 25.37 | | | 12.9 | 2.84 | | 25.37 | 2.72 |
| B. Beef and Veal - Beef | 39.8 | 19.11 | | | 39.8 | 8.76 | | 19.11 | 2.05 |
| C. Mutton and Goat | | | | | | | | | |
| 1. Mutton above aver. fed | 1.5 | 1.58 | | | 26.4 | 5.81 | | 6.34 | .68 |
| 2. Mutton, aver. fed[a] | 24.9 | 4.76 | To C.1 | | - | | | - | - |
| D. Sausage and Smoked Meats | | | | | | | | | |
| 1. Bacon | 4.5 | 7.28 | | | 7.3 | 1.61 | | 17.74 | 1.90 |
| 2. Ham | 4.5 | 7.28 | | | 7.3 | 1.61 | | 17.74 | 1.90 |
| 3. Sausage[a] | 8.5 | 31.38 | Evenly Divided D.1,D.2,D.4 | | - | | | - | - |
| 4. Salt Pork[b] | - | - | | | 2.8 | .62 | | 10.46 | 1.12 |
| E. Poultry - Chicken | 3.0 | 3.21 | | | 3.5 | .77 | | 3.24 | .35 |
| F. Rabbit | 0.5 | .03 | To E | | - | | | | |
| III. Fish | 3.1 | 3.3 | | 3.34 | | | 3.76 | | |
| A. Fresh and Frozen | | | | | | | | | |
| 1. Pike Perch | 25.8 | 15.9 | | | 100.0 | 3.34 | | 100.0 | 3.76 |
| 2. Sturgeon[a] | 25.8 | 15.9 | To A.1 | | | | | | |
| B. Salted - Herring[a] | 35.5 | 60.0 | To A.1 | | | | | | |
| C. Cured and Smoked - Sturgeon[a] | 6.5 | 7.8 | To A.1 | | | | | | |
| D. Caviar, Black[a] | 6.5 | 0.5 | To A.1 | | | | | | |
| IV. Sugar and Confectionery | 8.9 | 11.2 | | 9.60 | | | 12.76 | | |
| A. Sugar | | | | | | | | | |
| 1. Granulated | 75.0 | 55.5 | | | 100.0 | 9.60 | | 100.0 | 12.76 |
| 2. Lump[a] | | | | | | | | | |
| B. Confectionery | | | | | | | | | |
| 1. Chocolate Bon[a] | 25.0 | 44.5 | To A.1 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| V. Fats (incl. Butter) | 6.8 | 5.3 | | 7.34 | | | 6.04 | | |
| A. Butter | 60.0 | 47.0 | | | 59.5 | 4.37 | | 46.5 | 2.81 |
| B. Vegetable Oil | 13.0 | 33.0 | | | 12.9 | .95 | | 32.7 | 1.98 |
| C. Margarine | 1.0 | 5.0 | | | 1.0 | .07 | | 5.0 | .30 |
| D. Lard | 26.0 | 15.0 | | | 25.6 | 1.88 | | 14.8 | .89 |
| E. Mayonaise[b] | - | - | Given wt. 1.0, taken proportionately from group | | 1.0 | .07 | | 1.0 | .06 |
| VI. Milk and Milk Products (excl. Butter) | 12.7 | 7.2 | | 13.70 | | | 8.20 | | |
| A. Cheese | 3.2 | 7.0 | | | 3.2 | .44 | | 7.0 | .57 |
| B. Sour Milk Prod.[a] | 10.4 | 30.0 | To C.2 | | - | | | - | |
| C. Milk and Other Prod. | | | | | | | | | |
| 1. Fresh Milk | 86.4 | 63.0 | | | 86.4 | 11.84 | | 63.0 | 5.17 |
| 2. Condensed Milk[b] | - | - | | | 10.4 | 1.42 | | 30.0 | 2.46 |
| VII. Eggs | 2.8 | 1.4 | | 3.02 | | | 1.59 | | |
| Eggs | 100.0 | 100.0 | | | 100.0 | 3.02 | | 100.0 | 1.59 |
| VIII. Vegetables and Fruits | 12.6 | 16.0 | | 13.59 | | | 18.22 | | |
| A. Potatoes | 28.2 | 29.2 | +50.8% of C. | | 33.2 | 4.51 | | 33.5 | 6.10 |
| B. Cabbage and Saeurkraut -Cab. | 12.1 | 12.5 | +21.8% of C | | 14.3 | 1.94 | | 14.3 | 2.61 |
| C. Cucumbers[a] | 9.6 | 8.4 | Distributed to Fresh Veg. | | - | - | | - | |
| D. Onions and Garlic - Onions | 4.0 | 4.2 | + 7.2% of C | | 4.7 | .64 | | 4.8 | .87 |
| E. Beets, Carrots, and Turnips - Carrots | 2.4 | 2.5 | + 4.3% of C | | 2.8 | .38 | | 2.8 | .51 |
| F. Tomatoes | 4.8 | 3.3 | + 8.6% of C | | 5.6 | .76 | | 4.0 | .73 |
| G. Pumpkin[a] | 4.0 | 3.3 | To I | | - | - | | - | - |
| H. Canned Peas | 4.8 | 3.3 | - 1/2 to J | | 2.4 | .33 | | 1.67 | .30 |
| I. Lettuce[b] | - | - | Wt. of G + 7.2% of C | | 4.7 | .64 | | 3.9 | .71 |
| J. Canned Tomatoes[b] | - | - | + 1/2 of H | | 2.4 | .33 | | 1.67 | .30 |
| K. Fresh Fruit - Apples | 16.1 | 16.7 | | | 16.2 | 2.20 | | 16.7 | 3.04 |
| L. Canned Fruit - Apricots | 4.0 | 8.3 | | | 4.0 | .54 | | 8.3 | 1.51 |
| M. Dried Fruit - Prunes | 9.6 | 8.3 | | | 9.7 | 1.31 | | 8.3 | 1.51 |
| IX. Salt[a] | 0.2 | 0.2 | Distributed Proportionately to other groups | - | | | | | |
| X. Tea and Coffee | 1.1 | 1.5 | | 1.19 | | | 1.71 | | |
| A. Tea and Tea Substitutes | 91.0 | 95.0 | | | 91.0 | 1.08 | | 95.0 | 1.62 |
| B. Coffee and Coffee " | 9.0 | 5.0 | | | 9.0 | .11 | | 5.0 | .09 |
| XI. Alcoholic Beverages[a] | 7.1 | 12.0 | Distributed proportionately to other groups | | | | | | |
| All Commodities | 100.0 | 100.0 | | 100.0 | | 100.02 | 100.01 | | 99.99 |

Minor discrepancies are due to rounding.

(a) Commodities weighted by Chapman omitted from present study.

(b) Commodities not weighted by Chapman added to this study.

(c) Group weights (underlined) are per cent of total wts; Commodity weights are per cent of group.

Source: Basic 1928 and 1937 Weights (columns (1) and (2)) were constructed by Janet Chapman for her studies of Soviet retail price changes. A description of the nature and sources of the weights and a summary of the weights by commodity groups are presented in Janet Chapman, Real Wages in the Soviet Union, 1928-1952, RAND P-449 (forthcoming as a journal article), pp. 19-21.

# APPENDIX C: INDEX NUMBER PROBLEMS

Norman M. Kaplan

1. Let: $P_1, Q_1$ = USSR 1950 price and quantity, respectively;

$P_1^1, Q_1^1$ = USSR 1937 price and quantity, respectively;

$P_1^{11}, Q_1^{11}$ = USSR 1928 price and quantity, respectively;

$P_o, Q_o$ = US 1950 price and quantity, respectively;

$P_o^1$ = US December 1950 price;

$P_o^{11}, Q_o^{11}$ = US average 1947–1949 price and quantity, respectively;

$N$ = Number of price ratio observations.

Three sets of weights are available for the computation of the average ruble-dollar ratio for food prices (see Appendix B): (a) the 1928 pattern of expenditures in the USSR--i.e., the $P_1^{11}Q_1^{11}$ set; (b) the 1937 pattern of expenditures in the USSR--i.e., the $P_1^1Q_1^1$ set; (c) US "relative importance" figures, defined as $P_o^{11} \cdot Q_o^{11} \cdot \frac{P_o^1}{P_o^{11}}$ – i.e., the $P_o^1 Q_o^{11}$ set (see p. 10). The following index numbers have been computed with the results indicated (in rubles per dollar):

(1) $\dfrac{\sum \frac{P_1}{P_o} P_o^1 Q_o^{11}}{\sum P_o Q_o^1} = 25.27$

(2) $\dfrac{\sum \frac{P_1}{P_o} P_1^1 Q_1^1}{\sum P_1^1 Q_1^1} = 26.39$

(3) $\dfrac{\sum \frac{P_1}{P_o} P_1^{11} Q_1^{11}}{\sum P_1^{11} Q_1^{11}} = 25.50$

(4) $\dfrac{\sum \frac{P_1}{P_o}}{N} = 29.41$

(5) $\dfrac{\sum P_o Q_o^1}{\sum \frac{P_o}{P_1} P_o^1 Q_o^{11}} = 18.20$

(6) $\dfrac{\sum P_1^1 Q_1^1}{\sum \frac{P_o}{P_1} P_1^1 Q_1^1} = 18.68$

(7) $\dfrac{\sum P_1^{11} Q_1^{11}}{\sum \frac{P_o}{P_1} P_1^{11} Q_1^{11}} = 18.21$

(8) $\dfrac{N}{\sum \frac{P_o}{P_1}} = 18.45$

(All the enumerated results refer to ruble-dollar price ratios in which the dollar price is an average annual 1950 price and the ruble price is a post-March 1, 1950 price) The problem is: which of the eight index numbers are relevant?

2. Which of the index numbers are relevant depends, of course, on the purpose for which the index numbers are constructed. Two purposes are in mind: (a) the index numbers are to be used, along with others for other groups of consumers' goods, as price deflators; (b) the index numbers are to yield information on the existence and direction of correlation between price ratios $\left(\frac{P_1}{P_o}\right)$ and quantity ratios $\left(\frac{Q_1}{Q_o}\right)$. Both purposes require index numbers which are in, or are reducible to, the Paasche and Laspeyres forms. If we have an international value comparison in native prices and if we want to obtain international volume comparisons in (alternative) sets of constant prices, the appropriate price index numbers are Paasche and Laspeyres indexes. Algebraically, since

$$\frac{\sum P_o Q_o}{\sum P_1 Q_1} \cdot \frac{\sum P_1 Q_o}{\sum P_o Q_o} = \frac{\sum P_1 Q_o}{\sum P_1 Q_1}$$

and

$$\frac{\sum P_1 Q_1}{\sum P_o Q_o} \cdot \frac{\sum P_o Q_1}{\sum P_1 Q_1} = \frac{\sum P_o Q_1}{\sum P_o Q_o},$$

the appropriate price deflators are the Laspeyres and Paasche indexes, respectively:

$$\frac{\sum P_1 Q_o}{\sum P_o Q_o} \qquad (9)$$

and

$$\frac{\sum P_1 Q_1}{\sum P_o Q_1}. \qquad (10)$$

Also, the sign of the weighted correlation coefficient between the price ratios and quantity ratios can be inferred from the difference between the Paasche and Laspeyres indexes.[1]

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1. Irving Siegel, "The Difference Between the Paasche and Laspeyres Index-Number Formulas," Journal of the American Statistical Association, September 1941, pp. 343-350.

3. Though the Laspeyres and Paasche formulas, (9) and (10), are the index numbers we want, we cannot calculate them directly because of the absence of the quantity data necessary to construct such aggregative index numbers. However, price ratios and appropriate value data can be combined to form index numbers which are algebraically identical with the Laspeyres and Paasche index numbers. Thus:

$$\frac{\sum \frac{P_1}{P_o} P_o Q_o}{\sum P_o Q_o} \equiv \frac{\sum P_1 Q_o}{\sum P_o Q_o} ;$$

and

$$\frac{\sum P_1 Q_1}{\sum \frac{P_o}{P_1} P_1 Q_1} \equiv \frac{\sum P_1 Q_1}{\sum P_o Q_1} .$$

The question is: do we have, or can we obtain, the following index numbers or their equivalents:

$$\frac{\sum \frac{P_1}{P_o} P_o Q_o}{\sum P_o Q_o} ; \qquad (11)$$

and

$$\frac{\sum P_1 Q_1}{\sum \frac{P_o}{P_1} P_1 Q_1} . \qquad (12)$$

4. Though index numbers (11) and (12) are the index numbers we want because of their identity with the Laspeyres and Paasche index numbers, we do not have the appropriate sets of value data. We have neither the $P_1Q_1$ set nor the $P_oQ_o$ set. However, among the six weighted index numbers computed (see paragraph 1), two index numbers resemble, but are not algebraically identical with, formulas (11) and (12):

$$\frac{\sum \frac{P_1}{P_o} P_o{}^1Q_o{}^{11}}{\sum P_oQ_o{}^1} \quad (1)$$

and

$$\frac{\sum P_1{}^1Q_1{}^1}{\sum \frac{P_o}{P_1} P_1{}^1Q_1{}^1} . \quad (6)$$

(Index number (7) also resembles index number (12) but is excluded from the present argument on the grounds that its weights are more remote in time than the weights of index number (6)).

Index numbers (1) and (11) are equal if:

$$\frac{P_o{}^1Q_o{}^{11}}{\sum P_o{}^1Q_o{}^{11}} = \frac{P_oQ_o}{\sum P_oQ_o} \text{, for each commodity.} \quad (13)$$

Index numbers (6) and (12) are equal if:

$$\frac{P_1{}^1Q_1{}^1}{\sum P_1{}^1Q_1{}^1} = \frac{P_1Q_1}{\sum P_1Q_1} \text{ for each commodity.} \quad (14)$$

Unfortunately, we do not know whether conditions (13) and (14) are true. We have, perhaps, a suggestion that condition (14) is not true in the existence of substantial differences between the relative commodity distributions of the $P_1{}^1Q_1{}^1$'s and the $P_1{}^{11}Q_1{}^{11}$'s (Appendix B). Consequently, on this argument, we do not know whether index numbers (1) and (11) are equal and whether index numbers (6) and (12) are equal and we cannot regard index numbers (1) and (6) as the relevant ones.

5. Conditions (13) and (14) are sufficient, but not necessary, conditions for (respectively) the equivalence of index numbers (1) and (11) and the equivalence of index numbers (6) and (12). Can these equivalences be established in another way? Let us refer to the products of price and quantity (the various sets of PQ's) which enter the index numbers listed in paragraph 1 as "value weights." Among these index numbers, consider indexes (1) - (4) which are, formally, arithmetic means of the ruble-dollar ratios with, alternatively, US value weights, USSR value weights and no explicit weights. In numerical value, index (4) differs appreciably from indexes

(1) - (3): the introduction of an explicit weighting system--i.e., value weights for either of the countries--does make an appreciable difference in the results. The numerical differences among indexes (1) - (3), however, are less than 5 per cent: which of the alternative sets of value weights are used does not make an appreciable difference. Consider, also, indexes (5) - (8) which are, formally, harmonic means of the ruble-dollar ratios with, alternatively, US value weights, USSR value weights and no explicit weights. Here even the presence or absence of value weights makes no appreciable difference. The numerical differences among indexes (5) - (7) are less than 1 per cent. The stability of results among indexes (1) - (3) and among indexes (5) - (7) is a stability in the face of substantial differences in the relative distributions of Soviet 1928, Soviet 1937, and US value weights (see Appendix B). On the basis of these empirical observations, I am led to conclude that indexes (1) and (11), if we could compute the latter, would be approximately equal and similarly that indexes (6) and (12) would be approximately equal. Within the substantial range of observed variation in relative value weights, the set of value weights chosen does not affect the results appreciably. Accordingly, index (1) is taken as approximately equal to the Laspeyres index,

$$\frac{\sum P_1 Q_o}{\sum P_o Q_o},$$

and index (6) is taken as approximately equal to the Paasche index,

$$\frac{\sum P_1 Q_1}{\sum P_o Q_1}.$$

It should be re-emphasized that the basis for these conclusions is not the truth of conditions (13) and (14), which is unknown, but is rather an inference from the observed behavior of indexes (1) - (8). Like all inferences, the conclusions are not certainly true.

TABLE 1: RETAIL FOOD PRICES, MOSCOW AND US CITIES, 1950

| Commodity | Unit | Moscow Price (Rubles) | US Price | | Moscow -- US Ruble-Dollar Ratios | |
|---|---|---|---|---|---|---|
| | | | Average Annual (cents) | Average First Quarter (cents) | US Average Annual Price (Rubles per dollar) | US Average First Quarter Price (Rubles per dollar) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Cereals and bakery products** | | | | | | |
| 1. Flour, wheat | kg. | 5.04 | 21.5 | 21.3 | 23.44 | 23.66 |
| 2. Corn meal | kg. | 2.64 | 19.8 | 18.5 | 13.33 | 14.27 |
| 3. Rice | kg. | 13.54 | 37.0 | 36.2 | 36.59 | 37.40 |
| 4. Rolled oats | kg. | 5.62 | 28.7 | 28.4 | 19.58 | 19.79 |
| 5. Bread, white | kg. | 4.96 | 31.5 | 30.9 | 15.75 | 16.05 |
| **Meats, poultry, fish** | | | | | | |
| 6. Beef roast | kg. | 23.22 | 163.8 | 151.2 | 14.18 | 15.36 |
| 7. Pork chops | kg. | 32.83 | 166.2 | 145.1 | 19.75 | 22.63 |
| 8. Bacon | kg. | 40.80 | 140.4 | 129.9 | 29.06 | 31.41 |
| 9. Ham | kg. | 47.40 | 136.7 | 126.5 | 34.67 | 37.47 |
| 10. Salt pork | kg. | 43.50 | 76.3 | 69.9 | 57.01 | 62.23 |
| 11. Lamb | kg. | 22.03 | 164.0 | 152.3 | 13.43 | 14.46 |
| 12. Chicken | kg. | 23.94 | 101.6 | 92.8 | 23.56 | 25.80 |
| 13. Fish, perch | kg. | 9.70 | 91.5 | 89.1 | 10.60 | 10.89 |
| **Dairy products** | | | | | | |
| 14. Butter | kg. | 41.58 | 160.7 | 161.4 | 25.87 | 25.76 |
| 15. Cheese | kg. | 37.54 | 114.2 | 114.9 | 32.87 | 32.67 |
| 16. Milk, fresh | liter | 3.60 | 20.4 | 20.2 | 17.65 | 17.82 |
| 17. Milk, canned | 500 grams | 8.29 | 30.1 | 29.9 | 27.54 | 27.73 |
| **Eggs** | | | | | | |
| 18. Eggs, fresh | ten | 13.60 | 50.3 | 42.3 | 27.04 | 32.15 |
| **Fruits and vegetables** | | | | | | |
| 19. Apples, fresh | kg. | 16.40 | 26.5 | 22.0 | 61.89 | 74.55 |
| 20. Cabbage | kg. | .94 | 13.0 | 14.6 | 7.23 | 6.44 |
| 21. Carrots | kg. | .94 | 22.0 | 22.3 | 4.27 | 4.22 |
| 22. Lettuce | kg. | 3.00 | 27.3 | 29.5 | 10.99 | 10.17 |
| 23. Onions | kg. | 2.75 | 15.0 | 16.1 | 18.33 | 17.08 |
| 24. Potatoes | kg. | .90 | 10.2 | 10.4 | 8.82 | 8.65 |
| 25. Tomatoes | kg. | 3.00 | 53.6 | 51.8 | 5.60 | 5.79 |
| 26. Apricots, canned | kg. | 16.21 | 41.2 | 38.7 | 39.34 | 41.89 |
| 27. Peas, canned | kg. | 11.64 | 36.2 | 32.8 | 32.15 | 35.49 |
| 28. Tomatoes, canned | kg. | 12.45 | 26.0 | 25.1 | 47.88 | 49.60 |
| 29. Prunes, dried | kg. | 30.00 | 54.2 | 52.2 | 55.35 | 57.47 |
| 30. Beans, dried | kg. | 7.63 | 33.7 | 33.1 | 22.64 | 23.05 |
| **Beverages** | | | | | | |
| 31. Coffee | kg. | 75.00 | 175.0 | 168.7 | 42.86 | 44.46 |
| 32. Tea | 100 grams | 14.40 | 28.9 | 27.8 | 49.83 | 51.80 |
| **Fats and oils** | | | | | | |
| 33. Lard | kg. | 38.47 | 42.1 | 36.6 | 91.38 | 105.11 |
| 34. Salad oil | kg. | 27.00 | 78.5 | 73.0 | 34.39 | 36.99 |
| 35. Mayonnaise | kg. | 26.22 | 93.5 | 90.0 | 28.04 | 29.13 |
| 36. Margarine | kg. | 21.45 | 67.9 | 62.4 | 31.59 | 34.38 |
| **Sugar and sweets** | | | | | | |
| 37. Sugar | kg. | 11.48 | 21.4 | 21.2 | 53.64 | 54.15 |

For sources see Appendix A.