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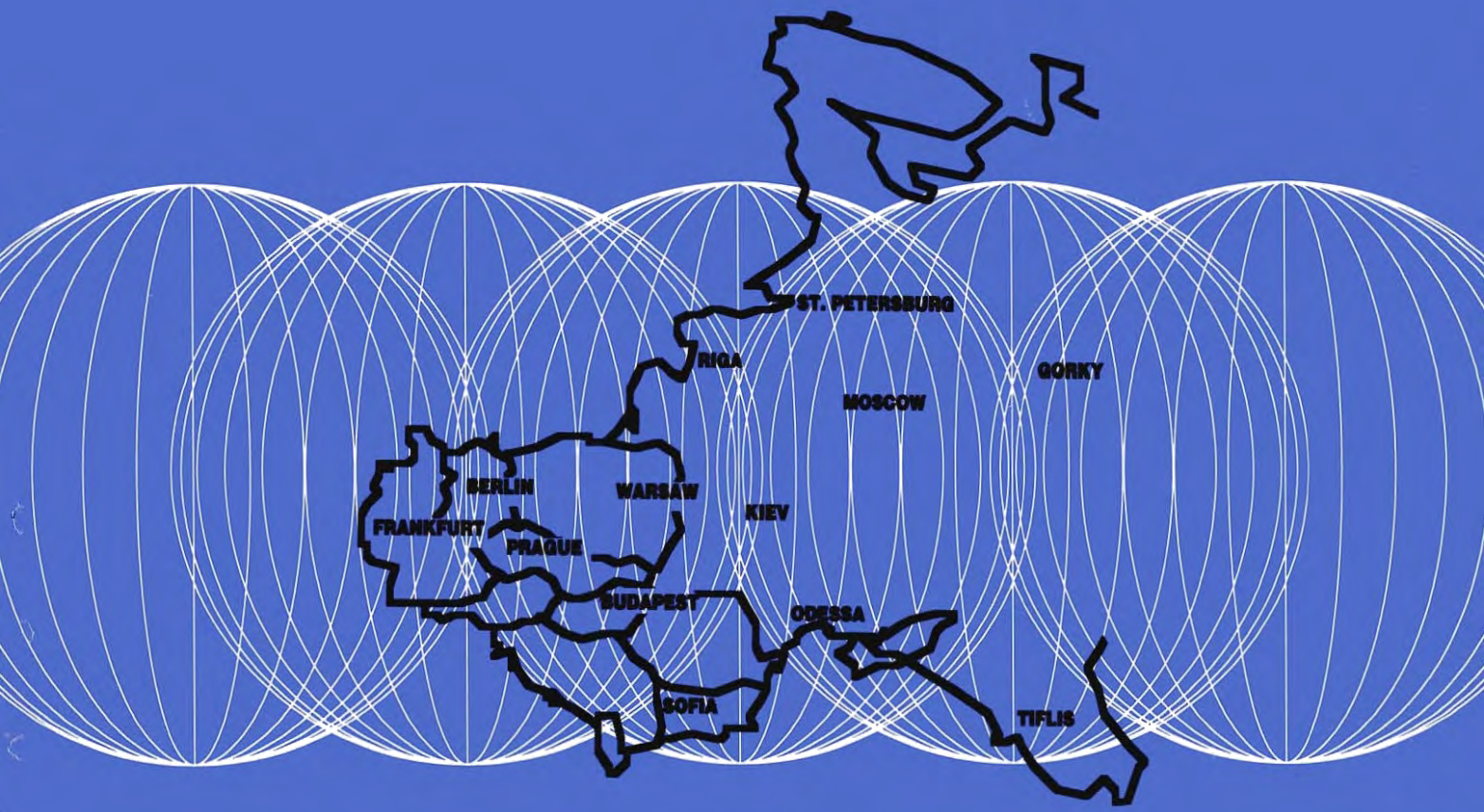
PROCEDURES FOR IMPLEMENTING THE RETIRED OFFICER HOUSING CERTIFICATE PROGRAM

DETERMINING FUNDING VALUES FOR EXISTING HOUSING UNITS



THE URBAN INSTITUTE
Prepared for the Office of Housing and Urban Programs (USAID)

PROCEDURES FOR IMPLEMENTING THE RETIRED OFFICER HOUSING CERTIFICATE PROGRAM

DETERMINING FUNDING VALUES FOR EXISTING HOUSING UNITS

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OVERVIEW OF PRICING METHODOLOGY

Introduction

A certificate entitles an officer to a certain amount of money which is shown on a bank funding letter. The amount of money stated on a bank funding letter depends upon the size of a unit, in terms of rooms, to which the officer is entitled. Officers may qualify for either a one-room, two-room or three-room unit whose total space in square meters is 33, 50, and 65 respectively.

The size of a unit that an officer may purchase (and, therefore, the amount indicated on the bank funding letter) only depends on the number of rooms his family is entitled to occupy according to current social norms. The funding value does not depend on the number of square meters to which the family is entitled. Therefore, two families may be entitled to different amounts of living or total space, but if their respective family compositions make them eligible for the same number of rooms, they will receive the same amount of money to purchase a unit.

The bank funding letter contains prices which determine how much an officer can receive to purchase a unit in an existing building during different months. The bank funding letter always includes two prices, one for each month in which the funding letter is valid for purchase of a unit. We shall refer to the prices which appear on bank funding letters as "bank funding values" or simply "funding values." Funding values are based on the prices of modest flats in high-rise structures.

Pricers are responsible for calculating funding values each month and transmitting these values to the bank and municipality, through the program reviewer. At the start of the new program, bank funding letters will contain funding values for purchase of existing units in October and November.

Five working days before the end of the month, a new final month funding value must be calculated to replace the expiring first month funding value. In the provided illustration, for example, a new funding value for December will be calculated and announced at the end of October and the October funding value will become invalid. The funding values previously calculated for November will then become the new first month funding values.

For each month, the pricers must calculate three funding values for one-room, two-room, and three-room units in existing buildings. The funding values appearing on the bank funding letter will be stated in dollars and cannot exceed US$25,000. The pricers, however, should ignore this $25,000 limit when it computes funding values. The municipality and bank will be responsible for implementing the $25,000 limit when they issue the bank funding letter. The responsibility of the pricers is to transmit funding values to the municipality and bank in both dollars and rubles. Even if a funding value exceeds the limit, the value will serve as a guide as to what a typical modest unit costs and indicate how much extra money an officer may need to purchase a unit.

General Approach

The steps for calculating funding values can be summarized as follows:

(1) Establish a base price (*in rubles*) for each unit size by multiplying the price per square meter of the 75th percentile (of a standard two or three room unit in a high-rise multi-family structure or individual home) by total floor space.

(2) Estimate monthly rates of inflation using the average monthly rate of inflation for the last three months, giving double weight to the most recent month.

(3) Inflate the base prices using inflation factors computed from the monthly rates of inflation.

(4) Assuming that the ruble to dollar exchange rate will increase at the same rate as monthly inflation, estimate an exchange rate for each month for which a price was calculated.

(5) Convert the ruble prices to dollar prices using the estimated exchange rates.

Worksheets

Worksheets are provided to make calculations simple (see Annex 1). Different sets of the worksheets have been created. One set is for the first two months of the program; other sets are used for the subsequent months.

DETAILED INSTRUCTIONS FOR THE WORKSHEETS

To facilitate your understanding of the following instructions, examples are presented in Annex A.

To simplify explanations we will use the following conventions:

- Specific data items are labeled with small letters (e.g., "[a]", "[aaa]", "[cc]", etc.). Each column of data items corresponds to a single month. Each row contains the same type of data. For example, from Worksheet 1 you can see that the base price for October is in the first column and is labeled "[c]"; the base price for November is in the second column and is labeled "[cc]".

- We will sometimes refer to all the data items in a single row (i.e., "[a]", "[aa]", and "[aaa]") as "row a". Therefore, when we say "multiply row a by row b," we mean multiply item [a] by item [b], item [aa] by item [bb], and item [aaa] by item [bbb].

Worksheet 1

Base Price Information

(1) In this table, Column [a] contains the monthly 75th percentile sales price per square meter of two and three room apartments. These prices were obtained by surveying apartment brokers and obtaining data on their actual transactions. The idea behind taking the 75th percentile as opposed to the average is to allow officers the possibility to purchase 3 out of every 4 existing units.

(2) Column [b] contains "smoothed" prices that will be used to calculate the monthly inflation rates. The smoothed prices are determined as follows:

(a) The actual price [a] of the first month listed is the smoothed price [b] for that month.

(b) For each of the following months, if a month's actual price is less than the preceding month's smoothed price, then the preceding month's smoothed price becomes the current month's smoothed price. Otherwise, the actual price is that month's smoothed price. For example, if the June smoothed price is 500 and the July actual price is 450, then the July smoothed price is 500.

(The effect of this rule is that the smoothed prices never decrease, but only can remain constant or increase from one month to the next. This correction is being applied to eliminate sharp drops and increases in the funding values caused by irregular market price information.)

(3) Column [c] is the monthly percentage change in the smoothed prices, which is calculated by dividing the current price by the price of the previous month and subtracting one from this result. For example, the September monthly percentage change in the price would be equal to: 100% x ((September price / August price) - 1).

Monthly Inflation Calculations

(1) Estimate mid-September inflation by using the monthly percentage changes for May through August (from Part A).

(2) Estimate the September 30 inflation by dividing in half the mid-September inflation (from formula 1).

(3) Estimate the October inflation by using the monthly percentage change for June through September 15 (from formula 1).

(4) Estimate the November inflation by using the monthly percentage change for July through October (from formula 1).

Inflation Factor Calculations

(1) Estimate the August to October inflation factor by using the mid-September, September 30, and October inflation calculations (from formulas 1, 2, and 3). Enter this inflation factor in item [d] on Worksheet 2.

(2) Estimate the August to November inflation factor by using the September to October inflation factor (from formula 5) and the November inflation calculation (from formula 4). Enter this inflation factor in item [dd] on Worksheet 2.

Worksheet 1-A

Worksheet 1-A is used to determine the base price per square meter and inflation factors for December and future months. The calculations are identical to those for Worksheet 1 except that you must use the most recent price per square meter data that is available. Blanks are left in the base price table for this purpose.

(1) When October base price data becomes available, calculate the 75th percentile of the price per square meter for all two and three room apartments. Enter the result in the space provided.

(2) Compute the monthly percentage change by dividing the October base price by the September base price and subtracting one from the result.

(3) Using the same procedures as you did for Worksheet 1, compute a September to December inflation factor and enter it in item [d] on Worksheet 2-A.

Worksheet 2

Use Worksheet 2 to calculate funding values for the first two months of the program. You will calculate prices for three unit sizes (i.e., one-room, two-room, and three-room units) for each of the first two months of the program (a total of six funding values). To calculate each funding value you must go through two steps:

To complete Step A:

(1) In row [a] enter the August price per square meter from Worksheet 1. You must use the August price for both months because it is the most recent price that is available.

(2) Calculate the base price by multiplying the August price per square meter by the unit size in row [b]. Enter the results in row [c].

To complete Step B:

(1) Enter the inflation factors from Worksheet 1 in row d. Enter the August to October inflation factor in item [d], the August to November inflation factor in item [dd].

(2) Compute the funding value by multiplying row [c] by row [d]. Enter the results in row [e].

Worksheet 2-A

Use Worksheet 2-A to calculate funding values for future months. The calculations are identical to those for Worksheet 2 except that you must use the most recent price per square meter that is available. For example, October figures will be used to calculate December prices.

Worksheet 3

You will use this worksheet to estimate exchange rates for the first few months of the program. You will use these exchange rates on Worksheet 4 to convert the ruble funding values (from Worksheet 2) into dollar values.

It is assumed that the increase in the exchange rate will equal the monthly inflation rates you estimated on Worksheet 1.

(1) The exchange rate you enter should be the Central Bank exchange rate in effect on the day you complete your funding value calculations. You can obtain this rate from the bank which is administering the program.

(2) Copy the appropriate monthly inflation rates from Worksheet 1 and calculate the monthly increases in the exchange rate.

(3) Calculate the exchange rate inflation factors using the monthly increases in the exchange rate. This resembles the price inflation factor calculations you did in step C of Worksheet 1.

(4) Estimate future exchange rates by multiplying the September exchange rate by the exchange rate inflation factors:

Worksheet 3-A

The instructions for Worksheet 3-A are basically the same as those for Worksheet 3. Worksheet 3-A uses the end-of-October exchange rate to calculate an exchange rate for the month of December. The result is entered on Worksheet 4-A.

Worksheets 4 and 4-A

After completing your funding value calculations each month, you must complete Worksheet 4 (4-A) and send it to the program reviewer. Worksheets 1 (1-A), 2 (2-A), 3 (3-A), must be attached to Worksheet 4 (4-A). You must complete all other worksheets before you complete Worksheet 4 (4-A).

Note the following:

(1) You must enter three prices (one for each unit size) in both rubles and dollars for each month being reported. The ruble figures are the funding values from Worksheet 1 (1-A).

(2) In converting rubles to dollars, use the exchange rate you calculated on Worksheet 3 (3-A). Record the exchange rate in each of the spaces provided on Worksheet 4 (4-A).

ANNEX 1

SAMPLE WORKSHEETS

Worksheet 1: Base Price and Inflation Factor Worksheet (first two months of program)
Worksheet 1-A: Base Price and Inflation Factor Worksheet (December 1994)

Worksheet 2: Funding Value Worksheet (first two months of program)
Worksheet 2-A: Funding Value Worksheet (December 1994)

Worksheet 3: Exchange Rate Worksheet (first two months of program)
Worksheet 3-A: Exchange Rate Worksheet (December 1994)

Worksheet 4: Bank Funding Value Transmittal Memorandum (first two months of program)
Worksheet 4-A: Bank Funding Value Transmittal Memorandum (December 1994)

Worksheet 1
BASE PRICE AND INFLATION FACTOR WORKSHEET

(first two months of program)

A. Base Price Information

Month	[a] Base Price (Rb 000s/m2) 75th Percentile	[b] Smoothed Price	[c] Monthly % Change in Price
April	_____	_____	
May	_____	_____	_____
June	_____	_____	_____
July	_____	_____	_____
August	_____	_____	_____

B. Monthly Inflation Calculations

Monthly inflation values are estimated using a weighted moving average. This means we calculate the average monthly rate of change for the last two months, giving double weight to the most recent month.

August to September 15 inflation calculation (percent):

[1] (_____ + _____ + 2 x (_____ + _____)) / 6 = _____
(May, Jun, Jul, Aug, Sept 15)

September 15 to September 30 inflation calculation (percent):

[2] (_____ / 2) = _____
(Sept 15, Sept 30)

September to October inflation calculation (percent):

[3] (_____ + _____ + 2 x (_____ + _____)) / 6 = _____
(Jun, Jul, Aug, Sept 15, Oct)

October to November inflation calculation (percent):

[4] (_____ + _____ + 2 x (_____ + _____)) / 6 = _____
(Jul, Aug, Sept 15, Oct, Nov)

C. Inflation Factor Calculations

August to October inflation factor [A]:

[5] (1 + (_____/100)) x (1 + (_____/100)) x (1 + (_____/100)) = _____
(Sept 15, Sept 30, Oct, [A])

August to November inflation factor [B]:

[6] _____ x (1 + (_____/100)) = _____
([A], Nov, [B])

Enter the August to October and August to November inflation factors on Worksheet 2 in items [d], [dd], respectively.

WORKSHEET 1-A
BASE PRICE AND INFLATION FACTOR WORKSHEET

(December 1994)

A. Base Price Information

Month	[a] Base Price (Rb 000s/m2) 75th Percentile	[b] Smoothed Price	[c] Monthly % Change in Price
May	_____	_____	
June	_____	_____	_____
July	_____	_____	_____
August	_____	_____	_____
September	_____	_____	_____

B. Monthly Inflation Calculations

Monthly inflation values are estimated using a weighted moving average. This means we calculate the average monthly rate of change for the last two months, giving double weight to the most recent month.

September to October 15 inflation calculation (percent):

[1] (_____ (Jun) + _____ (Jul) + 2 x (_____ (Aug) + _____ (Sept))) / 6 = _____ (Oct 15)

October 15 to October 31 inflation calculation (percent):

[2] (_____ (Oct 15) / 2) = _____ (Oct 30)

October to November inflation calculation (percent):

[3] (_____ (Jul) + _____ (Aug) + 2 x (_____ (Sep) + _____ (Oct))) / 6 = _____ (Nov)

November to December inflation calculation (percent):

[4] (_____ (Aug) + _____ (Sep) + 2 x (_____ (Oct) + _____ (Nov))) / 6 = _____ (Dec)

C. Inflation Factor Calculations

September to December inflation factor [A]:

[5] (1 + (_____ (Oct 15) /100)) x (1 + (_____ (Oct 30) /100)) x (1 + (_____ (Nov) /100)) x (1 + (_____ (Dec) /100)) = _____ [A]

Enter the inflation factor [A] on Worksheet 2 in item [d] for one, two, and three room units.

WORKSHEET 2
FUNDING VALUE WORKSHEET

(first two months of program)

The following computations are done for each unit size:

A. Price per square meter (rb/m2) X size (m2) = base price (rb)

B. Base price X inflation factor = inflated base price (rb)

where: a one (1) room unit = 33 m2;
a two (2) room unit = 50 m2; and
a three (3) room unit = 65 m2.

One-Room Unit

		October		November	
A.	August price per square meter	[a]	_____	[aa]	_____
	Size	[b]	33	[bb]	33
	Base price	[c]	_____	[cc]	_____
B.	Inflation factor	[d]	_____	[dd]	_____
	Funding value	[e]	_____	[ee]	_____

Two-Room Unit

		October		November	
A.	August price per square meter	[a]	_____	[aa]	_____
	Size	[b]	50	[bb]	50
	Base price	[c]	_____	[cc]	_____
B.	Inflation factor	[d]	_____	[dd]	_____
	Funding value	[e]	_____	[ee]	_____

Three-Room Unit

		October		November	
A.	August price per square meter	[a]	_____	[aa]	_____
	Size	[b]	65	[bb]	65
	Base price	[c]	_____	[cc]	_____
B.	Inflation factor	[d]	_____	[dd]	_____
	Funding value	[e]	_____	[ee]	_____

WORKSHEET 2-A
FUNDING VALUE WORKSHEET

(December 1994)

The following computations are done for each unit size:

A. Price per square meter (rb/m2) X size (m2) = base price (rb)

B. Base price X inflation factor = inflated base price (rb)

where: a one (1) room unit = 33 m2;
a two (2) room unit = 50 m2; and
a three (3) room unit = 65 m2.

		One-Room Unit	
		December	
A.	August price per square meter	[a]	
	Size	[b]	33
	Base price	[c]	
B.	Inflation factor	[d]	
	Funding value	[e]	

		Two-Room Unit	
		December	
A.	August price per square meter	[a]	
	Size	[b]	50
	Base price	[c]	
B.	Inflation factor	[d]	
	Funding value	[e]	

		Three-Room Unit	
		December	
A.	August price per square meter	[a]	
	Size	[b]	65
	Base price	[c]	
B.	Inflation factor	[d]	
	Funding value	[e]	

WORKSHEET 3
EXCHANGE RATE WORKSHEET

(first two months of the program)

A. Enter the latest September Central Bank ruble-dollar exchange rate:

_____ Rubles per one dollar Date: _____.

B. Assume that the increase in the exchange rate will equal the estimated monthly inflation rates. Insert below the monthly inflation estimates from Worksheet 1.

		Monthly Inflation Rate (%)	
[1]	September to October:	_____	(from Worksheet 1, eq. [3])
[2]	October to November:	_____	(from Worksheet 1, eq. [4])

C. Calculate exchange rate inflation factors:

September to October exchange rate inflation factor [A]:

[3] (1 + (_____/100)) = _____
[1] [A]

September to November exchange rate inflation factor [B]:

[4] _____ x (1 + (_____/100)) = _____
[A] [2] [B]

D. Estimate future exchange rates by multiplying the September exchange rate by the exchange rate inflation factors:

Oct exchange rate = Sep exchange rate x Sep to Oct inflation factor [A]

[5] _____ = _____ x _____

Nov exchange rate = Sep exchange rate x Sep to Nov inflation factor [B]

[6] _____ = _____ x _____

Enter the exchange rates computed in formulas [5] and [6] in the appropriate places in column (b) of Worksheet 4.

WORKSHEET 3-A
EXCHANGE RATE WORKSHEET

(December 1994)

A. Enter the latest October Central Bank ruble-dollar exchange rate:

_____ Rubles per one dollar Date: _____.

B. Assume that the increase in the exchange rate will equal the estimated monthly inflation rates. Insert below the monthly inflation estimates from Worksheet 1-A.

		Monthly Inflation Rate (%)	
[1]	October to November:	_____	(from Worksheet 1-A, eq. [3])
[2]	November to December:	_____	(from Worksheet 1-A, eq. [4])

C. Calculate exchange rate inflation factor:

October to December exchange rate inflation factor [A]:

[3] $(1 + (\underset{[1]}{\_\_\_\_\_}/100)) \times (1 + (\underset{[2]}{\_\_\_\_\_}/100)) = \underset{[A]}{\_\_\_\_\_}$

D. Estimate future exchange rate by multiplying the October exchange rate by the exchange rate inflation factor:

Dec exchange rate = Oct exchange rate x Oct to Dec inflation factor [A]

[4] _____ = _____ x _____

Enter the exchange rate computed in formula [4] in column (b) of Worksheet 4-A.

WORKSHEET 4
BANK FUNDING VALUE TRANSMITTAL MEMORANDUM

(first two months of the program)

Date: _____

To: Program Reviewer

From: Pricer

Subject: Military Housing Certificate Program Bank Funding Values

The pricer has computed the following funding values for *October and November 1994*:

October 1994	(a) Rubles	(b) Exchange rate	(a/b) Dollars
One-Room Unit	_____	_____	_____
Two-Room Unit	_____	_____	_____
Three-Room Unit	_____	_____	_____

November 1994	(a) Rubles	(b) Exchange rate	(a/b) Dollars
One-Room Unit	_____	_____	_____
Two-Room Unit	_____	_____	_____
Three-Room Unit	_____	_____	_____

The following supporting documents are attached:

(1) Worksheet 1: Base Price and Inflation Factor Worksheet

(2) Worksheet 2: Funding Value Worksheet

(3) Worksheet 3: Exchange Rate Worksheet

WORKSHEET 4-A
BANK FUNDING VALUE TRANSMITTAL MEMORANDUM

(December 1994)

Date: _____

To: Program Reviewer

From: Pricer

Subject: Military Housing Certificate Program Bank Funding Values

The pricer has computed the following funding values for *December 1994*

December 1994	(a) Rubles	(b) Exchange Rate	(a/b) Dollars
One-Room Unit	_____	_____	_____
Two-Room Unit	_____	_____	_____
Three-Room Unit	_____	_____	_____

The following supporting documents are attached:

(1) Worksheet 1: Base Price and Inflation Factor Worksheet

(2) Worksheet 2: Funding Value Worksheet

(3) Worksheet 3: Exchange Rate Worksheet

ANNEX 2

DATA COLLECTION METHODOLOGY

This annex outlines the procedures to be followed for gathering and entering data which will be used to calculate the 75th percentile price of 1 square meter of two- and three-room existing units.

Gathering Data

At least fifteen observations per month should be collected to continue forecasting prices for future months. If fifteen observations are not collected for each month, then the voucher price will not be changed for that month.

Information on the following descriptors should be collected:

(1) Region
(2) Location (close to center or not)
(3) Total Space
(4) Living space
(5) Number of rooms
(6) Kitchen space
(7) Building type
(8) Age of building
(9) Telephone
(10) Balcony
(11) Number of floors in building
(12) Floor number of apartment
(13) Seller's price (in rubles, if possible) this does not include broker fees, taxes, or other fees or charges
(14) Date of sale

Entering the Data

The data on apartment sales should be entered into a Lotus spreadsheet with the same format as YAR0994.WK1. The SPSS/PC+ program YAR0994.PRG was used to read these data into SPSS and perform some statistical analysis on them. One of the outputs from this program (Table 5) are the 75th percentile base prices that are used in Worksheet 1. The program YAR0994.PRG should only need to be modified slightly to adapt it to the calculations for later months (the only change is to add the exchange rates for the new months for converting the sales prices from dollars to rubles).

If seller's prices are not obtained, the following procedure should be used to obtain seller's price:

— Subtract 7 percent from price if buyer's price; and
— Subtract 10 percent from price if asking price

To calculate price per square meter only the final price and total space are needed. However, the other indicators are important for describing the sample. For example, these tell the types and sizes of the buildings and apartments so that adjustments can be made if necessary.

We want to calculate everything in rubles initially, therefore, the seller's price should be entered into the data file in millions of rubles. If data are given in dollars, then the exchange rate to use is the Central Bank rate at mid month. For the first half of 1994 the rates were the following:

April	1,293
May	1,560
June	1,693
July	1,772
August	1,853
September	1,940
October	2,022
November	2,108

If there are sufficient data (i.e., at least 15 transactions per month), then the data for two and three room apartments should only be used to calculate the 75th percentile of price per square meter. The 75th percentile of price per square meter should be calculated for each month.

The Office of Housing and Urban Programs of the Agency for International Development (USAID) addresses the shelter and urbanization needs of developing and formerly planned economies. In addition to administering the USAID Housing Guaranty Program, the Office supports a broad spectrum of urban activities in program planning, management and capital investment to benefit low-income urban families.

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U.S. Agency for International Development
Washington, D.C. 20523

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