

Description of Moscow Data

Data sources

1. Household income and accommodation statistics

In order to evaluate maximum capacity of mortgage products and demand for mortgages and housing it is necessary to have a detailed information about household incomes, size and living conditions.

In Russia, this data can be obtained from the Goskomstat and its regional branches responsible for carrying out a regular random survey of household incomes. In Moscow, this is the responsibility of the Moscow City Committee for State Statistics, which annually interviews 1300 households.

Alongside with the Goskomstat survey this research is based upon, there is also a selection of researches carried out by other institutions which may also provide the required data. For example, the North Carolina University (USA) and the Institute of Sociology of the Russian Academy of Science have been conducting an independent national survey of households. Unlike the Goskomstat survey, this research covers a much wider range of topics, but at the same time it uses samples that can hardly be considered statistically representative for a specific city (for example, in Moscow just 110 households were sampled for the survey).

Other household surveys conducted in Moscow also can hardly be used as a source of reliable data since they are focused either on one specific interest group (like middle and high-income class) or on one specific scope of topics (like political or TV preferences).

2. Real estate market statistics

The evaluation of households' capacity to purchase a home with one of available mortgage lending instruments should be based on the analysis of the effective demand and prices of the housing market.

Under the current practice of registration of real estate transactions it is impossible to obtain official statistics on real money paid for housing units. From realtors we know that at the moment housing prices announced in advertisements typically agree with amounts actually paid by purchasers for their new homes. This price correspondence is urged by the growing competition on the market and the shrinkage of a time period required for making a transaction.

Since September 2003 the financial journal "Dengi" has started to publish a small monthly survey of Moscow housing market. The article is supplemented by the graph, illustrating the gap in sale and asked prices. Unfortunately, they do not want to disclosure the source of information. It is clear to see on Fig. 1 that the gap is substantially small, so it permissible to use supply statistics on units rather than statistics on units sold. This statistics is usually collected and analyzed by real estate brokers who typically use more than 40 criteria for describing housing units offered for sale.

Fig 1. Average per square meter price of secondary housing in Moscow



Source: *Dengy* weekly, № 35 (440), 08.09 – 14.09.2003

It is worth to mention the database on units sold on the secondary housing market, collected by the Russian Multi Listing System (RMLS) not only in Moscow but in many other Russian cities as well. By the end of March 2003, this database had records on more than 19,000 Moscow units offered for sale and described by 41 criteria.

Regretfully there is actually no database on units offered on the primary market. Mostly this should be attributed to difficulties in standardization of uncompleted units and high volatility of prices for them (usually there is a significant gap between unit prices at the beginning and at the end of the construction period).

Description of DATA

Data for this report was obtained from the following sources:

1. Survey of Moscow households in 2002 by Moscow City Committee for State Statistics (Mosgorkomstat) (Annex 1)
2. Database on units sold on the secondary housing market in March 2003 collected by the Russian Multi Listing System (RMLS) and provided by A. Spaozzhnikov (Annex 2)

Household statistics

1. Household structure

The sample size is 1,380 households. The total number of household members in the sample was 3,652, including 42 percent male and 58 percent female members. 572 household members, or 16 percent of the sample, were children under age 18.

The average household in the sample had 2.65 members. The most popular household size in the sample was a two-member (31.7 percent) or a three-member (29.8 percent) household. Four-member and one-member households were registered much rarely, in 17 and 16 cases from every 100 respectively. So, in terms of accrued percentage, one-, two-, three- and four-member households made up the greatest portion of the sample – 94.7 percent, while households with five or more members accounted for mere 4.6 percent (See Table 1).

The average age of all respondents was 40.2. The average age of “responsible” household members was 49.7. Among “responsible” members the maximum age was 89, and the minimum - 19. The maximum age of the sample in general was 92.

For the most part women were registered as “responsible” members (86 cases from every 100).

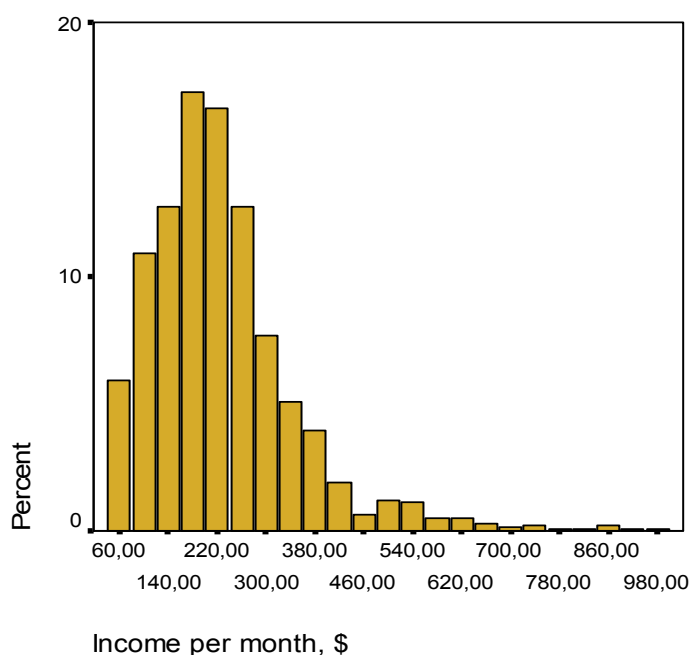
Table 1
Household size, members

Number of household members	Frequency	Percent	Accrued percent
1,00	223	16,2	16,2
2,00	437	31,7	47,8
3,00	411	29,8	77,6
4,00	235	17,0	94,6
5,00	64	4,6	99,3
6,00	8	0,6	99,9
7,00	2	0,1	100,0
Total	1380	100	

2. Finance

According to the sample data, household income, calculated in US Dollars (at the rate of RUR 31.1025 per US\$ 1) as a sum of incomes of all members of one household per months, amounts to the average of \$226. Minimum household income in the sample amounts to \$39.71, maximum – to \$981. The majority of household incomes are between \$50 and \$125, with \$100 having the maximum rate of occurrence (Figure 2).

Figure 2
Average income per sample household (USD per month)

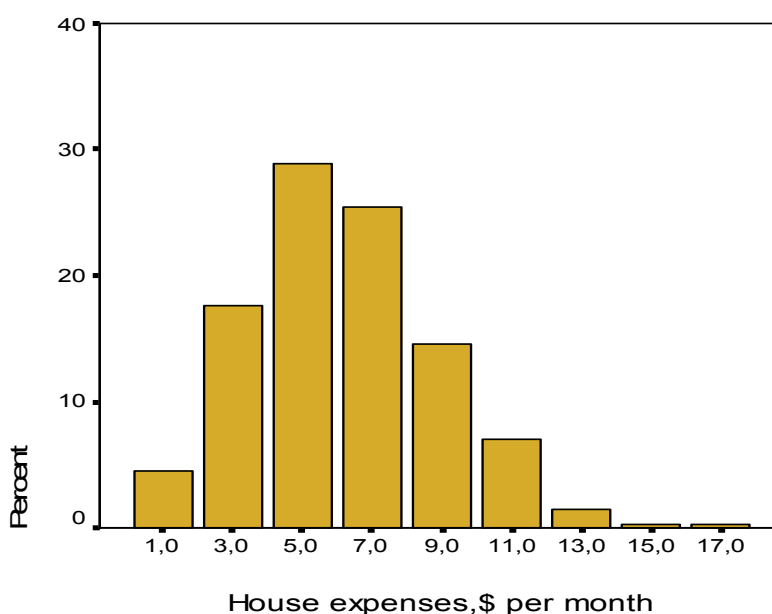


About 10% (or \$23) of household income is spent on taxes and other compulsory payments. Maximum household expenses for taxes and other compulsory payments amount to \$191.54.

According to the sample data, household expenses for housing and utility payments come, on the average, to \$6.2 a month per one household (Fig. 3). Maximum household expenses for rent and utility payments amount to \$17.62 a month, minimum – \$0.24. At the same time, the most frequent level of housing and utility expenses is between \$3.5 and \$8.5 a month. Which amounts between 1,5% and 3,7% of household income.

In addition to housing and utility payments, households (99% of all households) spend the average of \$2.9 on electricity payments, and in case of central gas supply (62% of respondents) – additional \$0.42. Maximum level of average monthly expenses for electricity and gas payments amounts to \$8.06 and \$2.22 a month, respectively. Which amounts between 3,5% and 1% of household income (Figure 3).

Figure 3. House expenses



According to the sample data, at the time of survey, 0.5% households were in arrears with their housing and utility payments. Small numbers of households are in arrears with their electricity payments (0.2%), and even less is in arrears with gas payments (0.1%).

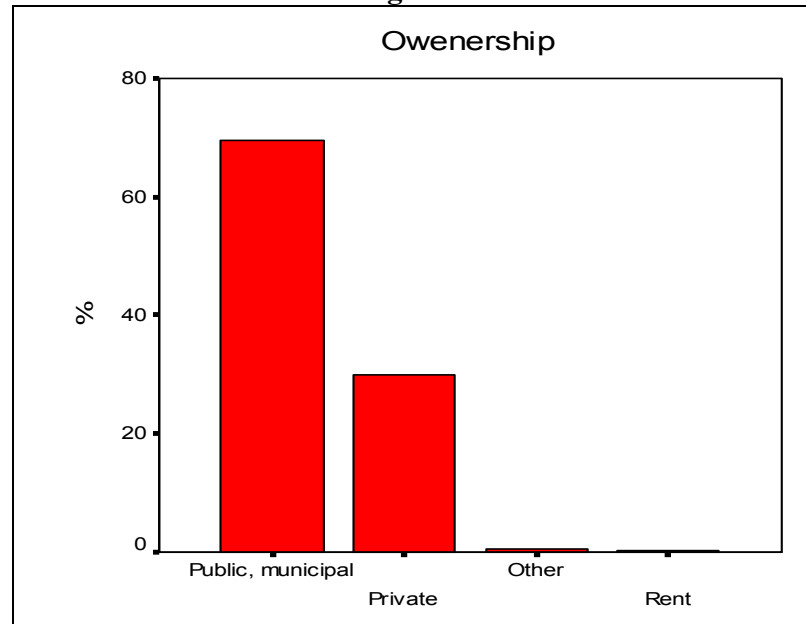
In addition to the above indicators, describing financial situation of households, the survey also included a number of questions regarding various types of loans and credits used by the household in the surveyed period. However, none of the respondents provided an answer which could indicate either presence or absence of such obligations.

3. Accommodations

The majority of surveyed households reside in Southern District of the city of Moscow (25.6%). Zelenograd, Northern and North-Western Districts are among the least represented in the sample: 0.9%, 7.7% and 8% respectively.

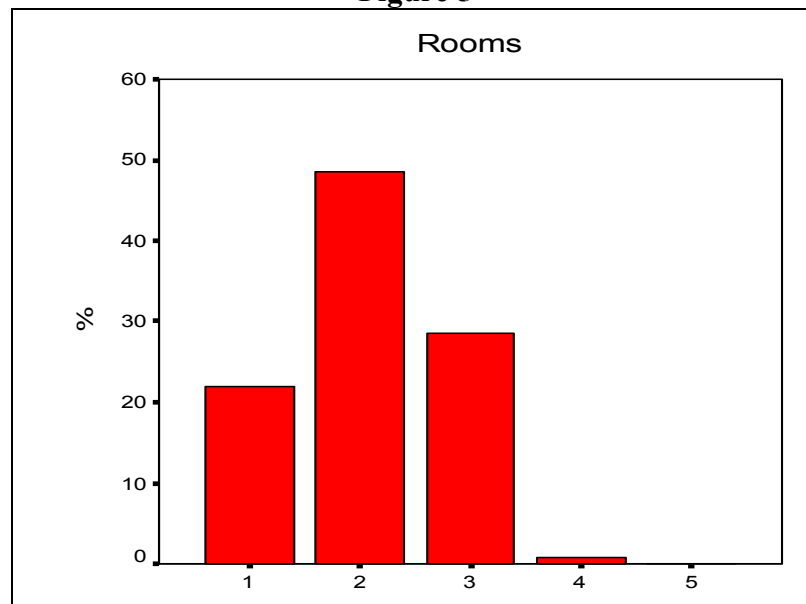
96.8% of sample households live in separate apartments, 3.1% - in communal apartments and dormitory-type accommodations. 29.9% of all housing units are owned by the households (privatized), 69.5% of apartments are owned by the state or municipality (Figure 4).

Figure 4



Average number of rooms in apartments comes to 2.08. Therefore, two-room apartments have the most frequency of occurrence (48.6%), three-room apartments constitute 28.6%, and one-room apartments amount to 22% of 1380 housing units included in the sample (Figure 5).

Figure 5



Average gross floor area of a housing unit amounts to 49.98 sq. m., while average living floor area amounts to 31.53 sq. m.

Among the sample households, the most frequent size of a housing unit is about 50 sq. m., while net floor space usually does not exceed 30 sq. m.

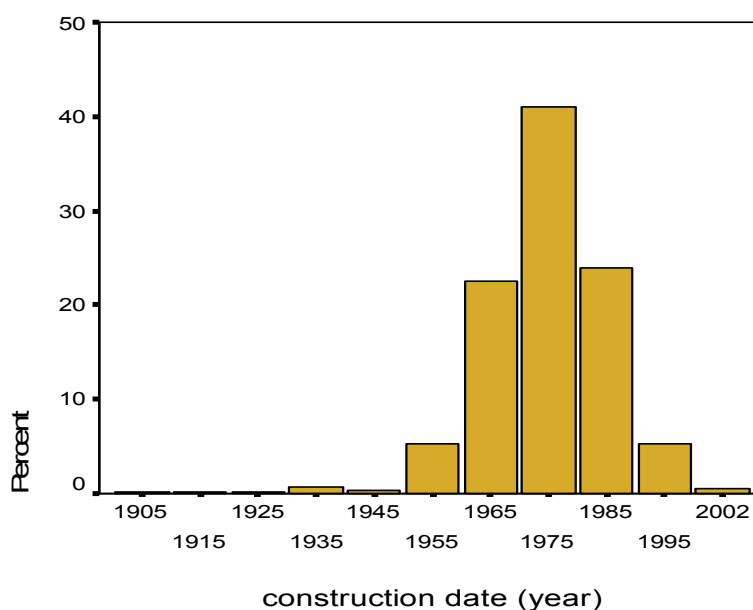
Consequently, taking into account total number of household members in the sample and gross floor area of all apartments, we can conclude that there is an average of 21.7 sq. m. of gross floor area and 13.7 sq. m. of net floor area per household member. The above figures are very close to corresponding figures, calculated for Moscow as a whole.

Minimum gross floor area occupied by a sample household is represented by communal apartment and amounts to 14 sq. m. (minimum net floor area – 7 sq. m). Maximum gross floor area is 120 sq. m, out of which 80 sq. m. is net floor area.

About 4.7% of all household members surveyed live in apartments with floor area below 10 sq.m. per person, and another 0.7% - in dormitories and communal apartments with floor area of 15 sq.m. per person. 96% of these respondents have been living in their homes for over 10 years.

Construction dates for sample housing units vary from 1895 to 2002. Average construction date is 1973. The majority of buildings were constructed between 1965 and 1985. Most of the surveyed households moved into their housing units between 1965 and 1990 (Figure 6).

Figure 6



77% of sample housing units are built out of concrete, including bearing-wall buildings, pre-engineered buildings and solid-cast buildings. 22.7% housing units are built of brick.

100% of sample apartments and buildings have central water supply and heating, 99% - hot water supply. 96.1% of households have stationary phones in their apartments.

Thus, the most typical household in the sample can be described in the following way. It's a family with relatively low income, which includes two or three middle-aged members (slightly over 40), and sometimes (quite rarely) one underage (under 18) child.

Total monthly income of such a family amounts to approximately \$200, 10% of which is spent on taxes and other compulsory payments every month. In addition, average household makes regular payments for electricity and gas, which amount to about \$15. According to the sample data, the average family pays its obligations and has no arrears.

The funds left after making tax, utility and other payments, are used for living expenses. The family makes no savings, as annual growth of its financial assets is between 0 and US\$ 100.

Average family lives in a separate non-privatized two-room apartment, in a building constructed during a period of mass residential construction (1965-1975). The apartment has central water and heating supply, its net floor area is 30 sq. m.

Housing units (apartments) statistics

This sample consists of 19,829 observations and represents one period – March 2003. Certain quantitative and qualitative characteristics are given for each unit (each apartment located within Moscow territory, put up for open sale), in particular:

- Gross floor area
- Net floor area
- Kitchen floor area
- Number of rooms
- Apartment layout
- Construction material
- Availability of a balcony and its characteristics
- Phone availability
- Price

Average gross floor area of all sample apartments amounts to 58.7 sq. m., 35.3 sq. m. of which is constituted by net floor area. The most frequent average gross floor area in the sample is 39 sq. m., net floor area – 19 sq. m.

Maximum size of apartment comes to 220 sq. m. of gross floor area and 151 sq. m. of net floor area.

Average kitchen floor area in the sample comes to 8.7 sq.m., while the most frequent average kitchen size is 10 sq. m.

Average number of rooms is 2.19. Maximum number of rooms in the sample is 4. One-room, two-room and three-room apartments constitute 93.7% of the sample. Two-room apartments amount to 34.9% of all sample housing units.

Only 10% of sample apartments have real value of Apartment Type Indicator, which describes the layout (isolated or interconnecting rooms). Out of this 10%, 85% have isolated rooms.

The majority of houses is built of brick (35%) and panels (55.5%). Pre-engineered and solid-cast buildings constitute 6.2% and 3.3% respectively.

In 91 instances out of 100, sample apartments have at least one balcony (42%) or recessed balcony (31.6%). 95% of apartments have stationary phones, 1.6% of apartments are in new buildings.

Price indicators are between \$15,000 and \$400,000 for an apartment. Consequently, minimum price per one sq. m comes to \$390.7, while maximum price – \$3,871. Average sample apartment costs \$65,927, while average price for the most frequently represented apartment is \$40,000, with price per one sq. m. at \$1,000.

Comparing the data on households, in particular, information on housing units they reside in, with the data on apartments put up for sale, we can note the following:

1. Average number of rooms in apartments offered for sale is quite comparable with average number of rooms in household sample apartments: 2.19 and 2.08 respectively.

At the same time, many sample households reside in two-room apartments (48.6%), while only 34.9% of apartments put up for sale are two-room apartments. “For sale” sample has more one-room and three-room apartments – by 4% and 4.2% respectively.

2. Average size (gross and net floor area) of apartments put up for sale exceeds the corresponding values for apartments from the household sample by 5-10 sq. m.

The value of minimum apartment size is almost the same in both samples, while maximum size of apartment from “for sale” sample exceeds the value of this indicator for “household” sample considerably – 220 sq. m (net – 151 sq. m) and 120 (80) sq. m. respectively.

3. Unfortunately, “for sale” sample does not contain any information on the date of construction, however certain comparison can be made by way of comparing the data on construction materials. Thus, 65% of buildings from “for sale” sample are built of concrete (bearing-wall buildings, solid-cast buildings), and 35% - of brick. 77% of buildings from household sample are also built of concrete, and 27% - of brick. Considering the fact that average date of construction of buildings from household sample falls within the period of mass residential construction (1965-1975), we can conclude that the majority of houses from “for sale” sample was also constructed in the same period.

4. As far as availability of central water, heat and gas supply is concerned, these data are not included into the “for sale” sample. At the same time, most of the “for sale” apartments have stationary phones, as do the apartments from household sample.

Description of “target houses”

The apartments priced at \$55 thousand, \$42 thousand and \$36 thousand were selected as «Target houses». This selection was based on the statistical survey data which have demonstrated that 50% of the apartments offered for sale were priced below \$55 thousand, 25% - below \$42 thousand, and 10% - below \$36 thousand. Thus, the market of “for sale” apartments was divided into four segments, each of which will be considered below in more detail.

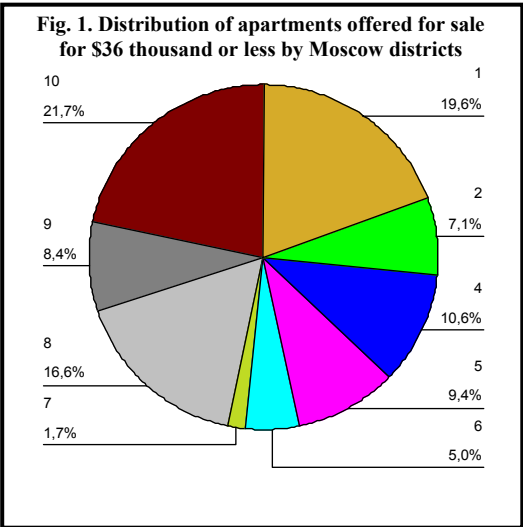
1. Apartments priced at \$36 thousand or less

The apartments in this price range are offered in almost any district of the city, however, the analysis shows that two out of three apartments of this price range are located in eastern and southern districts of Moscow (Eastern, South-Eastern, Southern) (see Fig.1), which are the least favorable in terms of environmental safety as air-mass transport in the city is mostly from the West. Most of the apartments offered for sale in this price-range are one-room – 95%, with floor area between 18 and 21 sq.m, and one third of these apartments have floor area of 19 sq.m (see Fig.2).

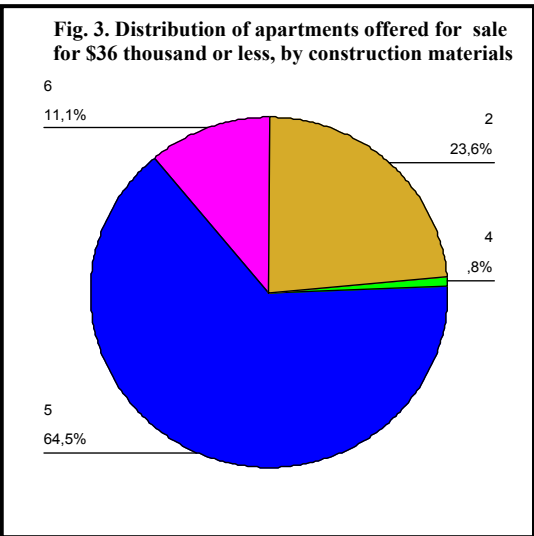
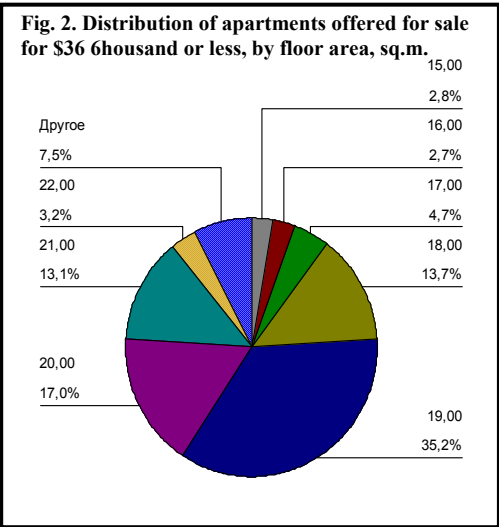
In 60% of these apartments, the floor area of the kitchen is less than 7 sq. m, and only in one out of every 5 apartments of this category the kitchen is bigger than 8 sq. m. The majority of these apartments – about 65% - are in bearing-wall buildings. Another quarter of these apartments are in brick buildings (see Fig.3).

Almost half of the apartments have balconies, one out of every five apartments has an additional recessed balcony. Nonetheless, 20% of the apartments offered for sale in this price range have neither recessed balconies, nor regular balconies. Half of these apartments have separate sanitary facilities, and only one out of every five has combined sanitary facilities.

Every other apartment in this price-range is located within walking distance (10 minutes) from the nearest metro station.



1 – Vostochnyi	6 – Severo-Zapadnyi
2 – Zapadnyi	7 – Tsentralnyi
3 – Zelenograd	8 – Yugo-Vostochnyi
4 – Severnyi	9 – Yugo-Zapadnyi
5 – Severo-Vostochnyi	10 –Yuzhnyi



1	Other	5	Bearing-wall
2	Brick	6	Preengineered
4	Solid-cast		

2. Apartments priced between \$36 thousand and \$42 thousand.

In this price range, there is a greater variety of apartments in terms of size and number of rooms. Distribution by location is mostly the same as for apartments in the \$36 thousand-or-less price range, although the share of apartments located in relatively more comfortable districts (Severnyi, Severo-Vostochnyi, Tsentralnyi) is slightly higher, and less apartments are located in less preferable districts, such as Yuzhnyi and Vostochnyi (see Fig.5).

The floor area of these apartments is larger compared to the floor area of the apartments of the previous group. Although about one quarter of the apartments offered for sale in this price range have floor area of about 19 sq. m, more than one half of the group have floor area of over 20 sq. m. While in the previous category over 95% of apartments had one room, this group only has 65% of one-room apartments, and one out of every three apartments of the group is a two-room apartment (see Fig. 6).

Average price of the apartments offered in this category is higher because of bigger kitchen floor area. While in the previous group, over 60% of apartments have kitchens of 7 sq. m or less and only one out of every five have kitchens of over 8 sq. m, in this group every other apartment has kitchen of over 8 sq.m. And only one third of apartments have small-size kitchens (less than 7 sq. m).

Most of the apartments, as in the previous group, are in bearing-wall buildings. Higher price clearly correlates with a bigger share of apartments in solid-cast buildings. However, this share is bigger not because of the reduction of the share of apartments in bearing-wall buildings, as one could expect, but due to reduction of the share of apartments in brick buildings (see Fig.8).

Seven out of every ten apartments of this category have either a balcony or a recessed balcony. Compared to the previous price-range category, the percentage of apartments which have neither recessed nor a regular balcony in this category (priced between \$36 and \$42 thousand) is almost two times less (see Fig. 7).

Combined or separate sanitary facilities can be observed in the apartments of this category with equal probability.

As far as the accessibility of the nearest metro station is concerned, the following can be said about the apartments in this price-range: over half of them are located within 10-minute-walking distance of the nearest metro station, but unlike the apartments in the previous category, only 2% of all the apartments offered in this category are located more than 15 minutes away from the metro.

Fig. 4. Distribution of apartments offered for sale at prices between \$36 and \$42 thousand, by Moscow districts

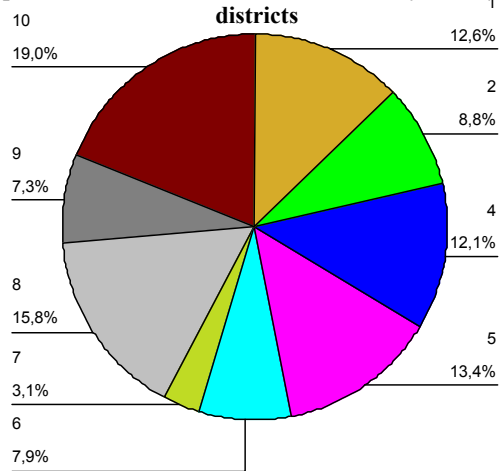
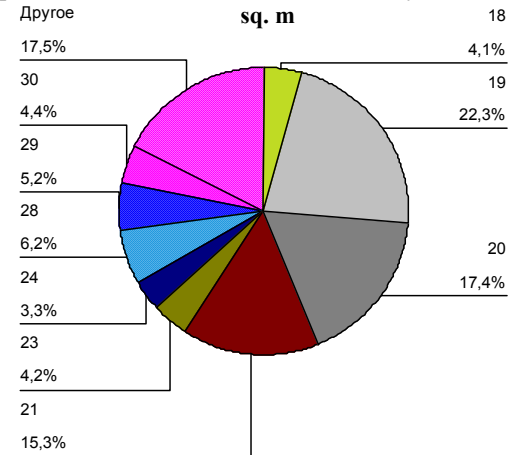


Fig. 5. Distribution of apartments offered for sale at prices between \$36 and \$42 thousand, by floor area, sq. m



1 – Vostochnyi	6 – Severo-Zapadnyi
2 – Zapadnyi	7 – Tsentralnyi
3 – Zelenograd	8 – Yugo-Vostochnyi
4 – Severnyi	9 – Yugo-Zapadnyi
5 – Severo-Vostochnyi	10 – Yuzhnyi

Fig. 6. Distribution of apartments offered for sale at prices between \$36 and \$42 thousand, by number of rooms

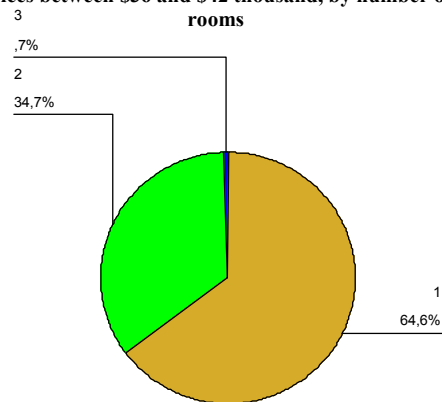
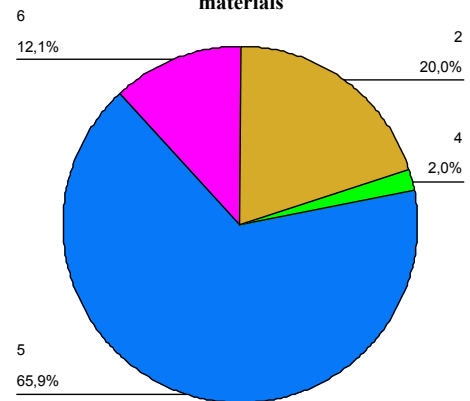
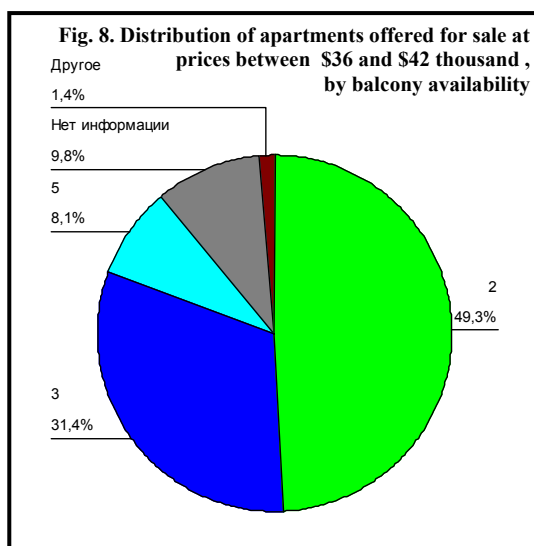


Fig. 7. Distribution of apartments offered for sale at prices between \$36 and \$42 thousand, by construction materials



1	Other	4	Solid-cast
2	Brick	5	Bearing-wall
3	Stone	6	Pre-engineer.



1	Other	5	No balcony
2	Balkony	6	Rwo rec. balconies
3	Recessed Balcony	7	Rec. balc+balcony
4	Two balconies		

3. Apartments priced between \$42 and \$55 thousand

A quarter of all the apartments offered for sale falls within this price-range, which approximately equals the sum of apartments offered for sale in the two above categories, therefore one could expect that the majority of sale-purchase transactions are concluded in this price-range.

Distribution of these apartments by Moscow districts is largely the same as in the previous group (\$36 - \$42 thousand). The share of apartments in preferred districts (Tsentrалnyi, Yugo-Zapadnyi, Severo-Zapadnyi, Zapadnyi) is only slightly higher – due to reduction of the share of apartments located in less advantageous districts (Vostochnyi, Yugo-Vostochnyi and Severo-Vostochnyi) (see Fig.10).

As far as the floor area is concerned, this price category displays a much greater variety of apartments than any of the above categories. Although almost a quarter of all the apartments offered for sale in this price range have floor area between 30 and 31 sq. m, there is also quite a big number of apartments with floor area of about 19 sq. m, as well as spacious apartments with floor area of over 40 sq.m, the latter representing over 10% of the apartments of this group.

In spite of the higher average price of the apartments in this category, the average kitchen size remains almost the same. Almost half (43%) of the apartments offered for sale in this price range have small-size kitchens (less than 7 sq. m). However, it should be noted that there is also a considerable share of apartments with relatively big kitchens (over 8 sq. m) in this category – approximately the same percentage as in the previous price-range category.

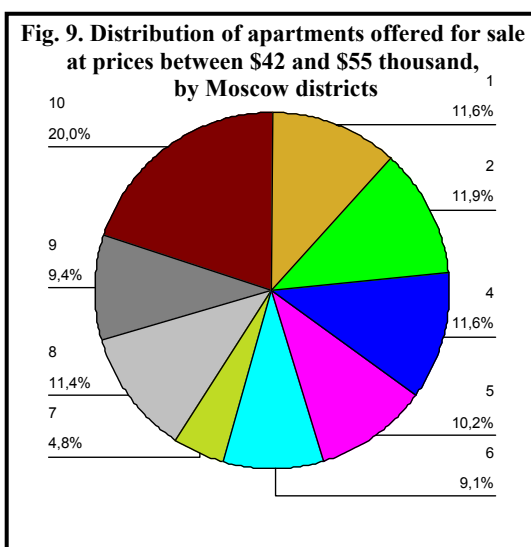
While there is no significant correlation between the higher average price of the apartment and the size of its kitchen, the distribution of the apartments in this price range by number of rooms clearly reflects the change in their average price. Thus, the room-number pattern observed in this price range is practically reversed, compared to the one found in the previous price-range category (\$36 - \$42 thousand). While in the latter group, over 65% of the apartments are one-room, in this price category one-room apartment account only for 18% of the group, while two out of every three apartments are two-room. Also, in this price range, four-room apartments account for over 0.5% (see Fig. 11).

Distribution of apartments by different types of buildings remains almost the same as in the previous price category. The only noticeable change is in the share of pre-engineered buildings, i.e. low-quality five-story buildings built of iron-concrete blocks of different size – their share drops from 12% to 7%. The difference is evenly distributed between the remaining types of buildings (brick, bearing-wall, solid-cast, etc.) (see Fig. 12).

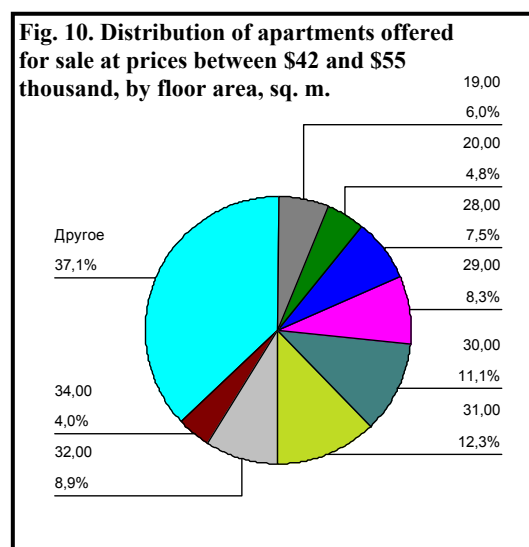
Transition into the next price range also has almost no influence on distribution of apartments in terms of balcony or recessed balcony availability. Price growth is only reflected in the reduction of the share of apartments without either recessed or regular balcony. Their share drops from 8% in the previous price category (between \$36 and \$42 thousand) to 6% in this category (between \$42 and \$55 thousand).

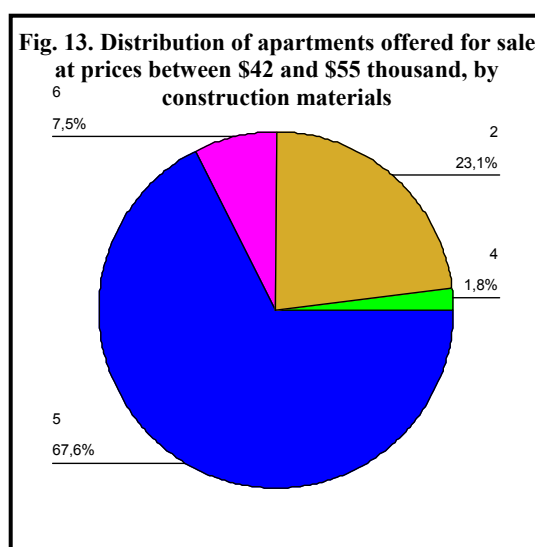
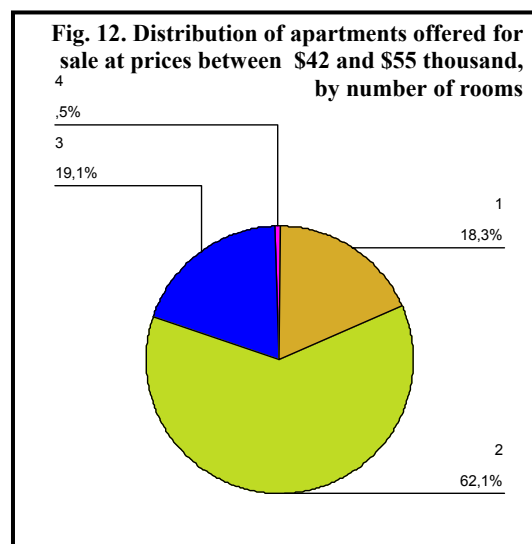
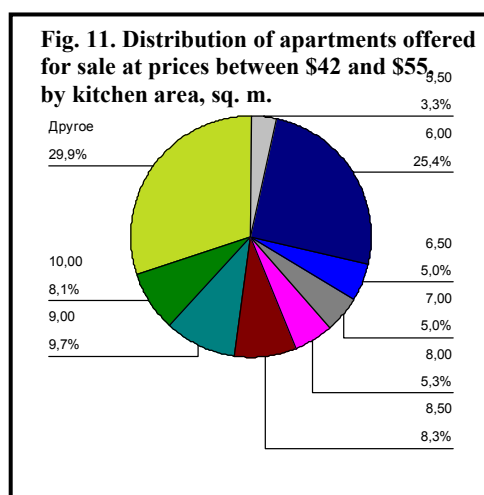
While in the previous price category, apartments with combined or separate sanitary facilities can be found with equal probability, in this price category over half of the apartments offered for sale have separate sanitary facilities, and only one third of all apartments have combined sanitary facilities. These changes show that quality of housing does improve compared to the previous price category.

As in the previous price category, about one half of the apartments offered for sale in this price range are located within 10-minute walking distance from the nearest metro station. The percentage of apartments located more than 15 minutes away from a metro station in this price category is somewhat lower: 1% instead of 2% in the previous category (\$36 - \$42).



1 – Vostochnyi	6 – Severo-Zapadnyi
2 – Zapadnyi	7 – Tsentralnyi
3 – Zelenograd	8 – Yugo-Vostochnyi
4 – Severnyi	9 – Yugo-Zapadnyi
5 – Severo-Vostochnyi	10 – Yuzhnyi





1	Other	4	Solid-cast
2	Brick	5	Bearing-wall
3	Stone	6	Preengineer.

4. Apartments priced at over \$ 55 thousand.

This is the last one of the four price categories, into which we divided the sample of apartments offered for sale. About one half of the sample apartments fall into this category. In general, the following can be said about this category.

The share of apartments located in prestigious districts (Tsentrалnyi, Yugo-Zapadnyi) in this price category is even higher than in the previous one. However, no drastic reduction of apartments in non-prestigious districts (Vostochnyi, Severo-Vostochnyi) is observed.

As far as floor area is concerned, majority of apartments in this group have floor area between 30 and 50 sq. m. Only 9% of the apartments in this price range have floor area below 30 sq. m., and only 1.5.% - over 50 sq.m.

While in three previous categories, no clear correlation was discovered between the average price of the apartments offered for sale and the size of their kitchens, in this price range a quality change is observed in the apartment pattern in terms of kitchen size. Only one quarter of these apartments have kitchens with floor area less than 7 sq. m., and more than half – kitchens with floor area over 8 sq.m. Such change is an evidence of considerable increase in housing comfort.

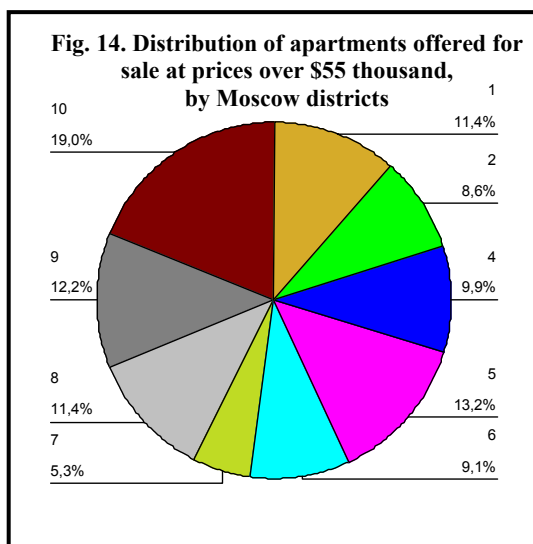
As far as number of rooms is concerned, considerable changes are also observed in this price category. The share of one-room apartments fell four times, compared to the previous price category, coming to 4%. The share of 3-room apartments more than doubled, thus every other apartment in this price range has 3 rooms. The share of four-room apartments exceeded 2%, while in the previous category four-room apartments constituted only 0.5%.

As far as construction materials are concerned, the distribution pattern in this price category does not change much compared to the previous one. The share of pre-engineered buildings is further reduced, and the share of solid-cast buildings is increased. As before, the majority of apartments (66%) are in bearing-wall buildings.

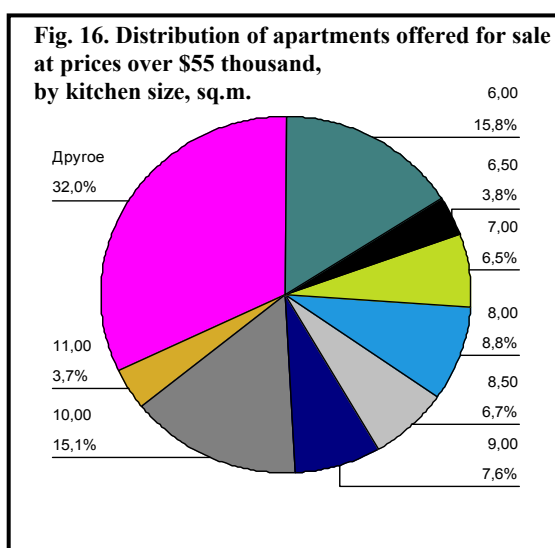
Compared to the previous price category, even smaller share of apartments does not have either recessed or regular balcony – only 4%. Over 80% of apartments have balcony or recessed balcony.

About 60% of the apartments offered for sale in this price range have separate sanitary facilities, and only 4% - combined ones, while in the previous price category the ratio was 50% to 30% respectively. Over 2% of apartments have two sanitary facilities.

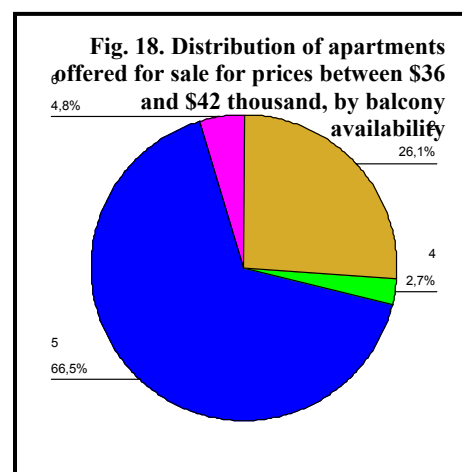
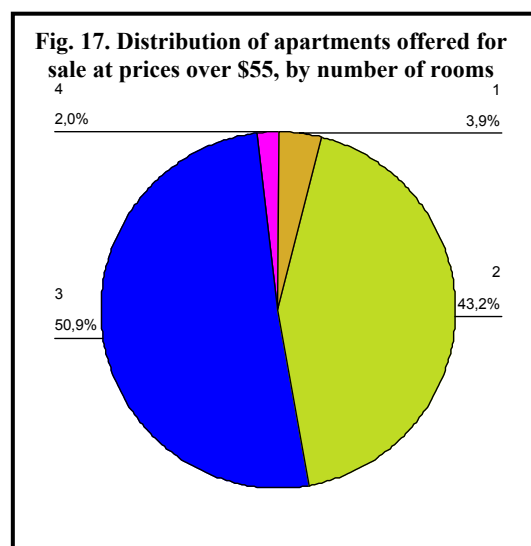
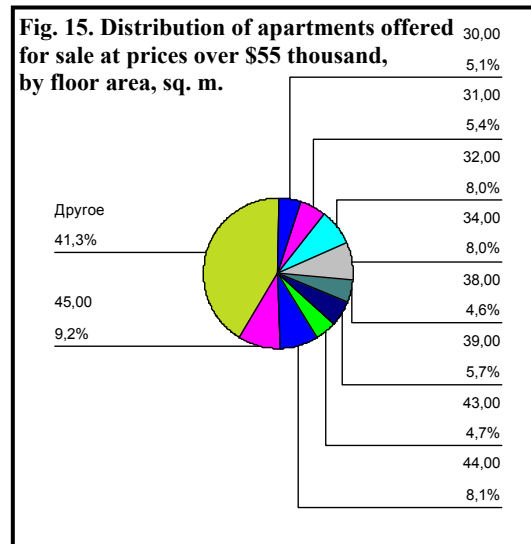
As far as the accessibility of the nearest metro station is concerned, as in the two previous price categories, about one half of the apartments are located within 10-minute walking distance from the nearest metro station.



1 – Vostochnyi	6 – Severo-Zapadnyi
2 – Zapadnyi	7 – Tsentralnyi
3 – Zelenograd	8 – Yugo-Vostochnyi
4 – Severnyi	9 – Yugo-Zapadnyi
5 – Severo-Vostochnyi	10 – Yuzhnyi



1	Other	5	No balcony
2	Balcony	6	Two rec.balc
3	Recessed balcony	7	Rec bal.+balcony
4	Two balconies		



Quality and reliability of official statistics

On the one hand, the quality and reliability of data collected by the RF State Statistics Committee (Goskomstat) still remains open for questions. On the other, the Goskomstat is the only source of household statistics with which the set tasks can be accomplished.

Therefore, it appears important to subject the available statistics to a thorough reliability test. The conducted research has demonstrated that incomes of the household group sampled for the survey were materially underestimated: sample average was less than RUR 3000 (less than \$100) per head against the official indicator¹ of RUR 13500² (\$450). Such great disparity may be caused either by unrepresentative survey resulted in the bias of the household structure, or by the deliberate underestimation of incomes by respondents³.

In order to have the opportunity to extend the results to all Moscow population we should weight the survey. The weights should be selected to be sure that the weighted sample is representative. The most simple and easy method for selecting weights is just to use coefficients that the Goskomstat applies when aggregating survey results. But at present this data is closed for the public access and therefore the issue how to choose weights still remains.

Considering the lack of weights in the Goskomstat household survey it appears necessary to study the nature of the bias of its sample. If the sample proves to be representative according to other variables it will be necessary just to adjust income in order to obtain adequate results.

One of the important indicators is the distribution of housing by districts and size (number of rooms). The statistics of the Moscow Housing Department showing the distribution of the Moscow housing stock by the apartment size (number of rooms) at 01/01/2002 is well comparable with the data produced by the surveyed sample (Table 1). Two-room apartments account for 45 percent of the Moscow housing stock (48,6 percent in the sample) and are followed by three-room apartments, which make up 28,8 percent of the stock (28,6 percent in the sample).

Table 1. Distribution of Moscow apartments by size (number of rooms) by the beginning of 2003, % of total

	Sample	Actual
Number of rooms		
1	21,96	21,7
2	48,62	44,8
3	28,55	28,9
4	0,80	2,7
5+	0,07	0,6

Sample – statistics of the random household survey

Actual – statistics of the Moscow Housing Department

The average size of households in the sample is 2.6 persons, which also approximates to the actual indicator.

¹ This indicator is determined by way of estimation of the balance of household incomes and expenses with findings of random household surveys ignored.

² *Moscow Household Distribution by Per Capita Money Income in January-December 2002*. The Moscow City Committee for State Statistics.

³ T. Velikanova, I. Kolmakova, Ye. Frolova. *Improvement of Methods and Models of Distribution of Households by Average Per Capita Money Income*. *Voprosy Statistiki*, № 5, 1996, p. 51.

According to the Moscow City Bureau of Technical Inventory (MosgorBTI) for every muscovite there were 22.8 square meters of housing as of 01/01/2003⁴. The random household survey estimated this indicator at 21.7 square meters.

Thus, in view of the further research it is possible to consider the sample representative by all indicators except income.

The comparison of the research findings about the sampled households with the Mosgorstat statistics on the household distribution by per capita income in January – December 2002 makes it possible to conclude that the sample mostly represents households with low and mid incomes. However, according to the Mosgorstat 70 percent of Moscow households also have incomes falling within the same income range, up to RUR 11,000 (\$364) per month.

Moreover, from the Mosgorstat statistics we know that in Moscow the most frequently registered indicators of household incomes fall within the limits of RUR 2,000 – 3,000 (\$64 - \$100) per month. So, upon the appropriate correction of the sample income data we find out that the per capita income average also falls within the same limits (RUR 2,652.5 (\$85 per month).

Following the Goskomstat method of adjustment of income distribution the survey results were corrected for “other” (also known as “hidden”) incomes⁵. This made it possible to correct the income statistics of the sample so that to bring it in consistency with the Goskomstat distribution statistics.

Strictly speaking, we are unable to reproduce the Goskomstat’s adjustment technique since the methodology is not published in details, but we know that it used the same survey to produce the aggregate statistics on economic indicators.

Adjustment of income for measurements of material well-being

Household income or expenditures needs to be adjusted for household composition to be a useful measure of material well-being. Clearly, a one-person household living on \$250 per month is materially better off than a five-person household living on \$250 per month. A simple solution is to divide by the number of household members, but most people would agree that a five-person household with \$250 per month is better off than a single person having to live on \$50 per month because of economies of scale in consumption.⁶ Economies of the scale arise in many ways – for example, by sharing certain expenditures on housing, utilities, cars, or newspapers. Apart from household size, the age or gender of household members may also influence the amount of income or consumption needed to attain a certain level of well-being. It is commonly thought, for example, that the consumption of very young children are less than working-age adults.

Economies of scale can be approximated by adjusting the household size variable to derive a variable called equivalent household size. For example, a household with an equivalent size of 2.5 needs to spend 2.5 times as much as single adult in order to be equally well off as the single adult. The equivalence scale usually takes both the age and the number of individuals in a household into account.

⁴ *Real Estate in Russia 2003*, p. 36.

⁵ T. Velikanova, I. Kolmakova, Ye. Frolova. *Improvement of Methods and Models of Distribution of Households by Average Per Capita Money Income*. *Voprosy Statistiki*, № 5, 1996, p. 50-58.

A. Shevyakov. *The possibility and perspectives of using statistics data for hidden income estimation*. *Voprosy statistiki*, № 6, 2003, pp. 12 - 22

⁶ This example is taken from “Making Transition Work for Everyone. Poverty and Inequality in Europe and Central Asia.” – World Bank, 2000.

Unfortunately, there is no accepted way to estimate equivalence scales.⁷ A number of methods are used, but each has major drawbacks.⁸

In our analysis we will apply the scale used in Armenia since it was designed to capture the features of exUSSR countries and specifics of their data collection processes.⁹

The weighted household size is calculated as the sum of weights of individuals according to the following rules:

Table 2. Equivalence scale.

Household member	Weights
Person 1 (Head of household)	1
Person 2 & adult	0.8
Person 2 & (senior or child)	0.7
Person 2 & young child	0.6
Person 3 & adult	0.7
Person 3 & (senior or child)	0.6
Person 3 & young child	0.5
Person 4 – N & adult	0.6
Person 4 – N & (senior or child or young child)	0.5

Table 3. Adult, senior, child and young child definition

	Age
Adult	18 – 60
Senior	≥ 60
Child	13 – 18
Young child	≤ 13

Construction of new variables

The dataset described above lacks some crucial variables like dwelling value, credit history of household and other, that we need for estimation of maximum loan capacity and potential demand for loan and housing. In this section we will discuss assumptions we have made and techniques we have used to calculate missing variables.

1. Crhistor – Household credit history

Credit history is an important factor determining the ability of a household to pay back mortgage loans. In most of the Eastern European countries, including Russia, credit bureaus have not been

⁷ See Deaton, Angus, and Christina Paxton. “Economies of Scale, Household Size, and the Demand for Food.” Research program in Development Studies, Princeton University, Princeton, N.J. Processed, 1996.; Deaton, Angus. *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy*. Washington, D.C.: World Bank, 1997.

⁸ See “Making Transition Work for Everyone. Poverty and Inequality in Europe and Central Asia.” – World Bank, 2000, for more discussions.

⁹ Brown, Annette. “Tax Policy and Poverty in Armenia.” USAID/Armenia Tax, Fiscal and Customs Reform Project. 2003.

established yet. One of the possible ways of evaluating the borrower's responsibility under his obligations is the analysis of the borrower's history of compulsory housing payments.¹⁰

For each sample household, credit history indicator is determined as follows:

1. Crhstor = 1 if the household has no arrears in housing and utility payments in the previous year
2. Christor = 0 if the household had arrears in housing and utility payments in the course of the last year.

2. Esprice – assessment of the housing value

Since our main dataset lacks housing value we should input this variable using available information, received from Moscow statistic committee and Moscow guild of realtors. The estimation methodology is described in Appendix 7, while Moscow guild of realtors' housing data is analyzed in Appendix 6.

3. Ssav – evaluation of household savings

One more deficiency of the official statistics is its inability to disclose the size of household savings, which is very important for evaluation of affordability of housing and mortgages for various household groups.

So, it was decided to evaluate the size of household savings in present Moscow by using expert opinions, according to which this indicator totals to almost \$30 billion¹¹.

To determine the distribution of savings among households it was assumed that savings of households were pro rata their aggregate adjusted incomes.

3. Ownst – Ownership of the housing

In many cases, households don't go through with their intention to sell their apartment and use the money for purchasing a new one. The reason for this is that the household doesn't have the ownership rights to the apartment. In this study, we assume that household has ownership rights to the apartment in two cases:

1. if the housing is owned by the household (i.e. privatized);
2. if the housing is owned by the state or municipality. In this case household members have the right to privatize the housing in which they reside¹². It has to be noted that the right to privatize their housing arises only once, but based on the available data this factor cannot be taken into account.

4. Bigfamd – household structure.

It is rather difficult to evaluate the household's desire to sell their apartment using statistical methods. As a rule, such evaluations are based on sociological surveys.

Approximate evaluation can be based on the analysis of the demographic structure of the household. Thus, households with complex demographic structure (e.g. families consisting of three generations) are more motivated to purchase additional housing than to expand their present apartment. In other words, such households may consider the possibility of selling their apartment in order to get the money for purchasing new housing.

¹⁰ N. Pastuhova, Recommendations on Evaluating the Probability of Residential Mortgage Loan Repayment (Loan Underwriting), M, IUE, 2003.

¹¹ The *Izvestiya* daily, 02/27/2003

¹² See Law of the Russian Federation #1541-1 "On Privatization of Housing Stock of the Russian Federation", of July 4, 1991, with changes and additions of November 26, 2002.

Based on the analysis of the data collected in the course of sample household survey, the following procedure can be proposed for evaluation of the household structure:

For household I $\text{Bigfam}_i=1$ if at least one of the following conditions is observed¹³:

1. 3 generation living together
2. 2 generation living together: spouses in the age under 70 living together with their children or parents (under 70).
3. Spouses living together with their children, older than 18.

¹³ For simplicity sake the mathematical equations are left out, but they can be provided at the user's request..