

COMMUTING: AN ANALYSIS OF WORKS  
BY SOVIET SCHOLARS

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## Preface

To gain better understanding of national and international development processes at the subnational regional level it is useful to have an analytic framework of functional economic areas, that is, relatively self-contained labor market areas. A major aspect of the Human Settlement Systems research task is the delineation of such areas in Western and Eastern Europe, Japan, Canada and the United States. In some cases the delineations have already been made. In other cases they are being made by institutions in our collaborative international network. Information about commuting patterns is a major element in the delineation process. Thus, it is highly instructive to have this survey of studies by Soviet scholars of commuting in the Soviet Union. We are indebted to Michael Pearson for the translation of this paper.

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11. Peter Nijkamp, *Spatial Mobility and Settlement Patterns: An Application of a Behavioral Entropy*, RM-76-45, forthcoming.
12. Niles Hansen, *Are Regional Development Policies Needed?*, RM-76-66, forthcoming.

Commuting:\* An Analysis of Works  
by Soviet Scholars

Abstract

This article analyzes a number of works by Soviet authors on problems of commuting. Among Soviet scholars there is no common view on this phenomenon. Some authors completely exclude it from the general class of migrations, citing its fundamentally different nature. They consider daily trips to work or places of study and travel not connected with change in place of residence to be special forms of dispersion resulting from scientific and technological progress and the active formation of urban agglomerations. Other authors consider commuting to be a special kind of population mobility (migration). At the same time, regardless of the differences among definitions given for "commuting", all the authors consider daily work- or cultural-related\*\* travel from place of residence to another settlement within the confines of an urban agglomeration to be an important and pressing problem. In this paper commuting data sources are analyzed and the scale and intensity of commuting in cities of various size are examined. In addition, data are given about the structure of work- and cultural-related travel in different cities according to the time expended and mode of transportation used. Attention also is given to socioeconomic aspects of commuting.

THE CONCEPT "COMMUTING"

In recent years, problems of population migration have increasingly attracted the attention of Soviet scholars and the number of scientific publications devoted to internal migration in the USSR has grown rapidly. A majority of Soviet authors

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\*Translator's note: The Russian term maetnikovaia migratsiia, literally "pendulum migration", is translated throughout this paper as "commuting".

\*\*Translator's note: The Russian term kulturno-bytovoi implies travel to "raise one's basic level of culture" or to raise the quality (usually in the intellectual sense) of one's everyday life. This might imply travel to a city to continue one's education, to exploit urban cultural institutions or even to enjoy the other material advantages that a city has to offer.

understand the term population migration to mean "a kind of mechanized movement of people whereby a shift of population occurs from certain settled points to others necessarily involving a change in place of residence [1]". This point of view is held, for example, by the well-known Soviet geographer, Professor V.V. Pokshishevskii. He writes:

A formal definition of migration is very simple. It is a shift of populations connected with a change in place of residence (change of governmental district or populated area in which this or that person, family or other broader community of individuals lives [2]).

Such authors strictly define commuting and exclude it from a general class of migrations because it is intrinsically different. Thus V.V. Pokshishevskii considers it necessary to fully exclude "so-called commuting to work motivated by the need to improve one's standard of living, etc., and made into cities from outlying areas (including rural settlements) and also such travel in the opposite direction (usually on a much smaller scale). Such commuting, although often associated with migration, is not connected with change of residence and only reflects a special form of settlement in which an individual's place of work is spatially separated from the place where he sleeps, rests, socializes with his family, etc.; this is not migration but rather a way of life which presupposes daily suburban travel. This travel, however, is in principle the same as travel involving regular use of inner-city transportation--sometimes it takes no more time than travel confined to the limits of a city.... Commuting embracing many tens of millions of individuals daily in developed countries (for limited hours and for very short distances) is intrinsically different and subject to different laws than is migration proper [3]".

A.V. Topilin writes: "Daily travel of working and student populations from place of residence to work and school and back within the boundaries of an urban agglomeration, travel required to satisfy demands for a better standard of living (termed 'commuting') and often associated with the concept of migration generally--has nothing in common with migration since it involves no change in place of residence. There are grounds for calling such mechanized population movement characteristic of sprawling, technologically advanced settlement systems 'shuttle travel' [4]".

One of the most serious Soviet scholars of rural migration, Dr. T.I. Zaslavskaia, believes that:

...the process of migration is best understood as the totality of population shifts over a country's territory connected with change in place of permanent residence [5].

Thus the point of view common to the above-mentioned authors may be reduced to the following: the fundamental feature of migration which allows one to distinguish it from all other kinds of population movement is a change of permanent place of residence.

However, not all Soviet scholars so categorically exclude commuting from the general class of migration. Thus B.D. Breev writes:

Territorial mobility (migration) is the movement of a person within a defined region or beyond its boundaries [6].

In this definition the basic characteristic of migration is the movement of a person, independent of whether or not this person changes his place of permanent residence.

B.S. Khorev and T.K. Smolina, in their work devoted to the study of commuting, write:

Commuting is a special kind of population mobility whose level within the boundaries of urban agglomerations depends entirely upon the settlement pattern of people in relation to where they work and study. It is shaped by a population's life style, by material and cultural requirements, the sophistication of transportation networks and means of communication [7].

These authors understand commuting to mean inter-settlement work connections, i.e. daily travel to work from one settlement to another.

From these views of various authors on commuting one may conclude that there is no common view in the works of Soviet investigators regarding the concept "commuting", and that the question of definition remains unresolved. Some authors (V.V. Pokshishevskii, A.V. Topilin) entirely exclude commuting from the general class of migration as a phenomenon intrinsically different. Others however, (B.D. Breev, B.S. Khorev, T.K. Smolina, A.J. Vishnevskii) consider commuting a special case of population mobility (migration).

However, independent of whatever view of commuting is taken by each of these authors--whether it is perceived as one example of a general class of migration or as a consequence of the special form of settlement resulting from an increase in the size and number of urban agglomerations--there is one thing which unites them all. All the authors feel that daily travel of a population from place of residence to work or school within the confines of an urban agglomeration is an important and pressing problem.

## ELUCIDATION OF THE PROBLEMS OF COMMUTING IN THE SOVIET SCIENTIFIC LITERATURE

Analysis of various aspects of commuting is quite important at the present time, largely owing to the development of urban agglomerations. At the same time we have significantly fewer specialized works devoted to the problem of commuting than works devoted both to migration proper and to urbanization and settlement [8].

Commuting has been studied most intensively in the Department of Socio-Demographic Settlement Problems of the Center for the Study of Population Problems of the Economics Faculty of Moscow State University. Researchers from this department have written a monograph, Migration Mobility of the Population in the USSR, which has a separate chapter devoted to questions of commuting, "Commuting as an Element of Local Population Mobility". Besides this, the Head of the department, B.S. Khorev, and scientific researcher T.K. Smolina, in joint authorship with A.G. Vishnevskii, have published a very interesting article devoted to this question, "Commuting in the USSR and Its Study [9]".

In addition to these works, there is an article by N.I. Druian, "The Balance of a Micro-Region's Labor Resources and a Method for Determining the Dimensions of Commuting [10]" and an article by L.E. Vand and G.A. Golts on "Contemporary Problems of Commuting Theory [11]".

Problems of commuting (work- and cultural-related travel of a population) are elucidated to a certain extent in a series of works devoted to present-day aspects of urbanization, to the maintenance of a balance of labor resources in different territories, and to the problem of urban agglomerative development. However, in these studies commuting is not given the attention it deserves.

From what has been said above it is apparent that commuting has not enjoyed the same detailed treatment in the Soviet literature as have population migration in general, urbanization, and settlement. However, on the basis of available literature one may get a definite idea of this process as well as its role in the development and functioning of cities and of urban agglomerations; and one may determine its future trends and the means for its optimal development.

## SOURCES OF DATA ON COMMUTING

It is potentially possible to gain information on commuting from several sources. First of all an up-to-date accounting of commuting trends in the USSR could be carried out through state statistical institutions. Unfortunately, at the present time there exists no up-to-date accounting of commuting patterns in



the USSR. More accurately, there only exists a statistical account of rural inhabitants working in cities, and although such data exist in the form of a time series, they undoubtedly do not capture all commuters, since travel of this kind is realized by individuals who live in small cities and city-like settlements, i.e. who are associated to urban populations.

It seems to us that the question of place of work should be included in population census programs. In a number of countries, in particular in Hungary (1960) and Czechoslovakia (1961), the question of place of work was included in the population census program. In the USSR during the census of 1970 an accounting was made of commuting in 107 cities whose total population numbered about 50 million people and in 445 suburban regions of these cities with a total population of more than 20 million people. This was the first time such an accounting of commuting had been made during a national census of the USSR.

It would be possible to carry out a specialized analysis of census primary materials (of census questionnaires) where data is contained regarding place of work and place of residence. Such an analysis would permit one to determine commuting zones, distribution of commuters according to sector of the economy, age, sex, educational level, and social and professional category. The major drawback of such a method, however, is the enormous labor it would involve. Because of the very large expenditures that would be required to analyze these data, it is not possible to include such analyses of commuting in a general census program. Work of this kind may be carried out by separate scholars studying commuting problems with respect to a limited number of objectives. Another drawback of this method is that data on commuting can be received only at the time of a scheduled population census, i.e. once every five or ten years.

Work-related commuting may be defined on the basis of data collected on the registration cards of individuals at their places of work. On these cards is indicated the home address of employees.

Further information may be obtained from the transport statistics of individual suburban areas, and also from special surveys (such as the survey conducted by the Center for the Study of Population Problems of Moscow State University). Other selective surveys of commuting trends have been carried out in the suburban areas of major cities.

If one evaluates on the whole the existing informational base for the study of commuting, then it is apparent that it should be broadened and perfected.

THE SCALE OF COMMUTING AND ITS INTENSITY IN CITIES OF VARIOUS SIZE

According to the figures of B.S. Khorev, T.K. Smolina and A.G. Vishnevskii in their article on commuting [12], this phenomenon fully encompasses not less than 10 million persons in the USSR, and represents approximately 12 percent of the average annual total number of blue and white collar workers and students of higher and secondary level specialized institutions.

Existing statistics show that about 3 million rural inhabitants work in cities and industrial settlements [13].

In the monograph, "Migration Mobility of the Population in the USSR" the authors divide all economic regions of the USSR into five groups according to the size of a rural population commuting coefficient [14].

- |   |   |
|---|---|
| I. <u>High Mobility (107 ‰):</u>          | The Central Region (RSFSR)  |
| II. <u>Heightened Mobility (54-69 ‰):</u> | Northwestern Region (RSFSR), Donets-Dnieper<br>Southwestern Region (Ukrainian SSR), Baltic Region (Lithuanian Latvian, Estonian SSR)                                      |
| III. <u>Average Mobility (42-47 ‰):</u>   | Volga-Viatka, Central-"Chernozem" Region (RSFSR), Belorussian SSR   |
| IV. <u>Reduced Mobility (22-31 ‰):</u>    | Volga, North-Caucasian and Ural Regions (RSFSR)<br>Southern Region (Ukrainian SSR)<br>Transcaucasian Region (Georgian SSR, Azerbaidzhan SSR, Armenian SSR, Moldavian SSR) |
| V. <u>Low Mobility (10-17 ‰):</u>         | West-Siberian, East-Siberian Far Eastern Regions (RSFSR), Kazakh SSR, Central Asian Region (Uzbek SSR, Kirgiz SSR, Tadzhik SSR, Turkmen SSR).                             |

Let us introduce a table, taken from the above-indicated monograph, where commuting patterns of the rural population of the USSR are presented on the basis of economic regions (Table 1).

Table 1. Commuting patterns of the rural population of the USSR [15].

|                            | The percentage of urban population for the total population of the given region | Commuting Coefficient (%) |                          | Growth in number of commuters over 1965-1970. (1965 is taken as 100%) |
|----------------------------|---|---------------------------|--------------------------|---|
|                            |   | at the beginning of 1965  | at the beginning of 1970 |   |
| USSR                       | 56  | 31                        | 39                       | 119.5   |
| RSFSR                      | 62  | 35                        | 42                       | 109.2   |
| Northwestern Region        | 73  | 47                        | 59                       | 111.3   |
| Central Region             | 71  | 97                        | 107                      | 95.9  |
| Volga-Viatka Region        | 53  | 29                        | 42                       | 125.8   |
| Central-"Chernozem" Region | 40  | 35                        | 47                       | 118.0   |
| Volga Region               | 57  | 15                        | 24                       | 137.7   |
| North-Caucasian Region     | 50  | 18                        | 27                       | 147.2   |
| Ural Region                | 69  | 17                        | 23                       | 103.0   |
| West-Siberian Region       | 61  | 12                        | 13                       | 109.2   |
| East-Siberian Region       | 62  | 10                        | 10                       | 84.4  |
| Far Eastern Region         | 71  | 11                        | 14                       | 115.6   |
| Ukrainian SSR              | 55  | 40                        | 56                       | 131.5   |
| Donets-Dnieper Region      | 70  | 41                        | 54                       | 117.6   |
| Southwestern Region        | 38  | 28                        | 62                       | 134.2   |
| Southern Region            | 57  | 18                        | 31                       | 172.8   |
| Belorussian SSR            | 43  | 35                        | 46                       | 120.9   |
| Baltic Region              | 59  | 52                        | 69                       | 117.9   |
| Lithuanian SSR             | 50  | 42                        | 61                       | 135.9   |
| Latvian SSR                | 62  | 55                        | 69                       | 118.6   |
| Estonian SSR               | 65  | 78                        | 94                       | 117.5   |
| Kaliningrad District       | 73  | 51                        | 68                       | 119.3   |
| Transcaucasian Region      | 51  | 19                        | 24                       | 138.7   |
| Georgian SSR               | 48  | 28                        | 35                       | 124.1   |
| Azerbaidzhan SSR           | 50  | 11                        | 14                       | 136.3   |
| Armenian SSR               | 59  | 16                        | 31                       | 206.5   |
| Central Asian Region       | 38  | 15                        | 17                       | 130.2   |
| Uzbek SSR                  | 37  | 12                        | 13                       | 121.4   |
| Kirgiz SSR                 | 37  | 23                        | 28                       | 142.7   |
| Tadzhik SSR                | 37  | 16                        | 20                       | 143.4   |
| Turkmen SSR                | 48  | 17                        | 18                       | 124.4   |
| Kazakh SSR                 | 50  | 7                         | 11                       | 148.4   |
| Moldavian SSR              | 32  | 15                        | 25                       | 169.5   |

In the Central Region the rural population commuting coefficient is almost three times greater than that of the all-Union average, and in Eastern Siberia it is almost four times less than the all-Union average.

One may get an idea of the intensity of commuting for the USSR rural population by examining Figure 1, which was introduced by the authors of the above monograph.

Rural population commuting is very high in the Moscow and Leningrad districts. In the Moscow district the rural population commuting coefficient is 254 ‰, in Leningrad it is 169 ‰. The coefficient is very high in the industrial districts of the RSFSR Central Region and in a number of districts of the Ukrainian SSR. Thus in the beginning of 1970 it was 139 ‰ in the Vladimir District, 112 ‰ in the Ivanovsk District, 98 ‰ in the Tula District, 128 ‰ in the Lvov District, 105 ‰ in the Kiev District, and 85 ‰ in the Kharkov District.

Rural population commuting levels are very low in the Siberian, Far Eastern, Kazakhstan and Central Asian regions.

Differences in commuting patterns for different regions of the USSR are due to various factors: the level of a district's or republic's industrial development; the density of the rural population; the density of industrial centers; the degree of development of the transportation network.

Cities--large, medium and small--with developed industry serve as centers of attraction for the rural population. If in a district there is a developed, multi-functional city-center, then, as a rule, this center significantly increases the commuting level of the rural population.

The low commuting level of the rural population in the republics of Central Asia is explained by the low social and spatial mobility of the population of Central Asia.

The authors of the given monograph analyzed the materials of the All-Union Population Census of 1970 regarding the movement of blue and white collar workers to their jobs and of secondary school and college students to places of study for different cities of the USSR. They used materials which give an idea about the scale of commuting in 43 large- and medium-sized cities: in seven cities with population over one million, in 15 cities with population from 500,000 to one million, in 14 with population from 250,000 to 500,000 in four with population from 100,000 to 250,000 and in three with population from 50,000 to 100,000 [17].

From the data given in Table 2 it is clear that the highest general commuting coefficient  $\left(\frac{c + b}{D_{\text{Total}}}\right)$  holds for cities with population from 100,000 to 250,000 and the lowest coefficient

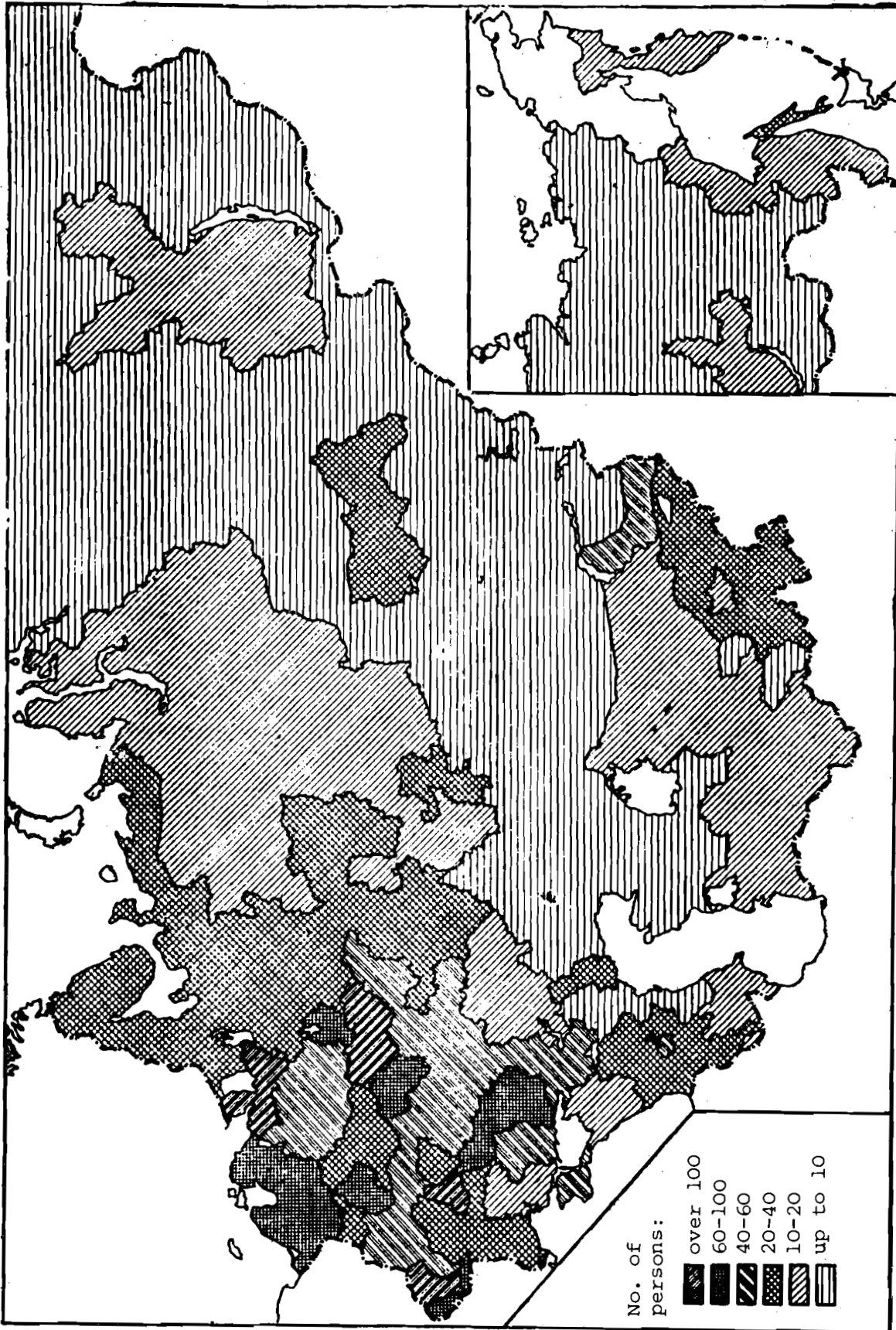


Figure 1. Commuting patterns of the rural population in 1970 (number of individuals working and studying in urban settlements per 1000 rural inhabitants). [16]

Table 2. Commuting in different cities according to data from the USSR 1970 population census [21].

| Groups of cities according to number of inhabitants | Number of cities in the group | Number of people who both live and work or study in a given city | Number of people living in the given average city but working and studying in its suburbs | Number of people living in suburban areas but working and studying in the given average city | D=A+C-B    | $\frac{C}{D} \times 100$ | A+B+C=<br>D <sub>Total</sub> | General commuting coefficient<br>$\frac{C+B}{D_{Total}} \times 100$ |
|---|-------------------------------|--|---|--|------------|--------------------------|------------------------------|---|
|   |                               | A  | B   | C  |            |                          |                              |   |
| Over 1 million people                               | 7                             | 7,947,273  | 114,305   | 734,866  | 8,567,834  | 8.58                     | 8,796,444                    | 9.6   |
| 500,000 to million people                           | 15                            | 2,459,582  | 36,082  | 194,902  | 2,618,402  | 7.44                     | 2,690,566                    | 8.6   |
| 250,000-500,000 people                              | 14                            | 1,486,773  | 22,474  | 122,298  | 1,586,597  | 7.71                     | 1,631,545                    | 8.9   |
| 100,000-250,000 people                              | 4                             | 77,781   | 1,192   | 28,072   | 104,661    | 26.82                    | 107,045                      | 27.3  |
| 50,000-100,000 people                               | 3                             | 101,416  | 2,368   | 5,711  | 104,759    | 5.45                     | 109,495                      | 7.4   |
| Totals:   | 43                            | 12,072,825   | 176,421   | 1,085,849  | 12,982,253 | 8.36                     | 13,335,095                   | 9.5   |

is for cities of population from 50,000 to 100,000. Of course here one should bear in mind that with both these groups an insignificant number of cities is involved. In connection with this fact it is difficult to draw conclusions about the true intensity of commuting for these cities.

The authors of the article "Commuting in the USSR and its Study" [18] speak of how it is customary to consider the problem of commuting as existing primarily for large cities. However, data from a number of sample surveys reveals that intensive work- and cultural- (school-) related ties are also characteristic for medium-size and small cities [19].

Thus according to the data of I.K. Orfanov, in a number of medium and small cities of the Volga-Viatka economic region the proportion of employed non-urban population was 10-25%, while in the large cities of this same economic region (Gorky, Kirov, Dzerzhinsk, Saransk, Cheboksary), the proportion of the non-urban population was 5-10% [20].

Interconnected settlement systems also presuppose travel to work from the main (central) city to the satellite settlements. Such work-related flow in the opposite direction is less than the work-related flow toward the center of attraction. For example, the commuter-flow of Muscovites to outlying areas is 10-20% of the in-bound commuter flow. In small cities the size of the counter-flow increases. Thus for 62 medium and small cities of the Volga-Viatka economic region and of the Novgorod District (Northwestern economic region) the proportion of individuals working outside of the city limits in relation to those coming into the city for work was, on an average 44.8%: in cities with a population of 50,000 - 100,000--10%; 20,000 - 50,000--32.7%; up to 20,000--54.5% [22].

On the whole, two regularities are intrinsic to commuting. Work-related trips by men are more frequent than those by women and the proportion for individuals involved in commuting decreases as their qualifications increase, i.e. people with lower professional qualifications predominate [23].

#### THE STRUCTURE OF WORK- AND SCHOOL-RELATED TRAVEL IN DIFFERENT CITIES ACCORDING TO TIME EXPENDED AND MODE OF TRANSPORTATION USED

In a study of commuting it is necessary to analyze expenditures of travel time and also to account for modes of transportation used for cities of various size.

Commuter travel time is a very important indicator and may be characterized as a "continuation" of time on the job. Such travel time has a direct impact on the amount of free time people have at their disposal. As a result of a series of

studies conducted both in the USSR and a number of other countries, a direct dependence was revealed between work-related travel and such factors as work-readiness, state of health, productivity, and fluctuations in labor manpower. It appears that there exist definite limits for commuting distances and thus for commuting travel time.

V.G. Davidovich believes that the maximum settlement radius for large industrial centers is one hour and for industrial centers of medium size (with a total population of 40,000 - 60,000)--30 to 40 minutes [24].

An analysis of the data of Table 3 and Figure 2 permits us to conclude that only 8.6% of all commuters live within the boundaries of 40-minute accessibility for large cities (with a population of over one million inhabitants); 18.5% for cities with 500,000 to one million inhabitants; 30.1% for cities with 250,000 to 500,000 inhabitants; 31.5% for cities with 100,000 to 250,000 inhabitants, 36.3% for cities with 50,000 to 100,000; and 52.9% for cities with less than 50,000 inhabitants. Within the boundaries of 60-minute accessibility live 33.4%; 48.6%; 64.3%; 66.1%; 68.8%; 84.0% of commuters respectively. Consequently in cities with populations up to 500,000, more than half the commuters spend at least an hour commuting. In small cities the percentage of people in the 60 to 90 minute travel-time category is small (12.4%) and for travel of a longer duration--quite insignificant (3.6%).

On the other hand, in cities with over 500,000 inhabitants, the peak interval occurs in the 60-90 minute range and the majority of commuters live in the boundaries of two-hour accessibility (94.0% for cities over one million and 95.1% for those of 500,000 to one million). Apparently the considerable time required for these trips is tied in part to the time required for travel within the city proper.

The chief modes of transportation associated with commuting in the USSR are railroad and bus services. The percentage of bus travel increases as the size of urban population decreases. The percentage of commuter travel by rail is highest in large cities. Modes of transport such as subway, streetcar and trolley bus are especially prevalent in large cities.

Private modes of transportation (car, motorcycle, motor scooter, bicycle) are used relatively more often in smaller cities. Here it should be stressed that private transportation is little used in the USSR for daily commuter travel. This is explained on the one hand by the existence of a widely-developed system of public transportation and on the other, by the very low cost for its users, especially for commuters [17]. Thus private means of transportation are found more in smaller cities where rail and bus transportation are less developed.





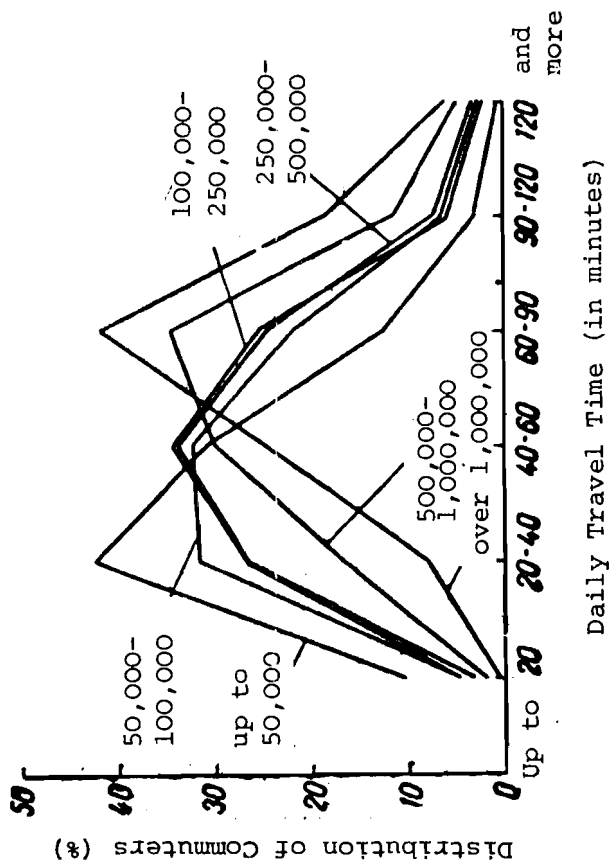


Figure 2. Commuting time for different groups of cities (according to data of the 1970 census). [26]

### SOCIOECONOMIC ASPECTS OF COMMUTING

At present commuting level is determined by two basic groups of causes:

- 1) Socioeconomic causes that make for an increase in work- and school-related travel.
- 2) Technological and economic factors which make such travel possible.

The socioeconomic causes include:

- 1) The rapid increase in jobs available outside agriculture and their concentration in cities.
- 2) Growth in new enterprises and expansion of old ones, both stimulated by technological and economic demands.
- 3) The attractiveness for the rural population (especially young people) of urban employment or work in industry.
- 4) The insufficient tempo of urban housing construction.

Technological and economic causes include:

- 1) Improvements in suburban railroad passenger service.
- 2) Improvements in suburban bus service.
- 3) Rapid growth of private modes of transportation (cars, motorcycles, motor scooters).

Commuting is a complex phenomenon which has its positive as well as negative sides. Among the positive aspects of commuting are:

- 1) In a number of instances it significantly helps to supplement the labor resources of cities. (For example, in Kharkov almost one-fifth of the city's manpower requirement is met by commuters; approximately the same figure applies to Moscow) [28].
- 2) Commuting widens the zone of influence of large cities--the most important centers of economic and cultural wealth.
- 3) Commuting increases a population's social mobility, creates the possibility for a wider choice of professions and occupations and promotes a more rational use of labor resources.

Table 4. The structure of commuting according to mode of transportation and size of city [29].

| Mode of Transportation                  | Groups of cities according to number of inhabitants |                     |                   |                   |                  |              |
|---|---|---------------------|-------------------|-------------------|------------------|--------------|
|   | Over 1 million                                      | 500,000 - 1,000,000 | 250,000 - 500,000 | 100,000 - 250,000 | 50,000 - 100,000 | up to 50,000 |
| Subway                                  | 18.6%   | 0.2%                | -                 | -                 | 0.8%             | -            |
| Streetcar                               | 10.5%   | 16.0%               | 4.3%              | 2.8%              | 4.0%             | -            |
| Trolley bus                             | 6.9%  | 9.8%                | 14.9%             | 13.2%             | 0.2%             | 0.1%         |
| Bus                                     | 22.9%   | 34.3%               | 52.8%             | 54.5%             | 60.8%            | 89.4%        |
| Railroad                                | 44.3%   | 37.3%               | 25.4%             | 23.4%             | 30.9%            | 1.8%         |
| Car, motorcycle, motor scooter, bicycle | 1.8%  | 2.4%                | 2.6%              | 6.1%              | 3.4%             | 8.7%         |
| Total                                   | 100.0%  | 100.0%              | 100.0%            | 100.0%            | 100.0%           | 100.0%       |

- 4) Commuting promotes the development of new forms of settlements which mix urban and rural elements. The interface between urban and rural life styles is constantly expanding near large cities.

Commuting, however, also has several negative sides:

- 1) It leads to quite substantial nonproductive expenditures of free time on travel.
- 2) Extended travel time between home and work gives rise to "commuter fatigue" which has a number of negative consequences.
- 3) Commuting diverts significant resources from the State budget for the organization of transportation services.

In conclusion, it is worthwhile to mention that commuting is an objective process stemming from present day socioeconomic demands and made possible by technological-economic advances. Commuting has become widely spread not only in the suburban areas of large cities but also in those of medium-sized and small cities. While taking into account the positive and negative sides of commuting one must seek not to curtail the phenomenon to a minimum, but to optimize it. Some of the most promising possibilities for this include: the development of high speed modes of transportation, the expansion of urban housing construction, and the construction of a series of enterprises tied with the processing of agricultural products in rural areas.

Footnotes

- [1] Topilin, A.V., *Territorial'noe pereraspredelenie trudovykh resursov v SSSR* (Territorial Redistribution of Manpower Resources in the USSR), Ekonomika, Moscow, 1975, 3.
- [2] Pokshishevskii, V.V., Population Migration as a Social Phenomenon and Problems Regarding its Statistical Study, in *Statistika migratsii naseleniia* (Population Migration Statistics), Statistika, Moscow, 1973, 10 (in Russian).
- [3] Pokshishevskii, V.V., *op. cit.*, 14-15.
- [4] Topilin, A.V., *op. cit.*, 3.
- [5] Zaslavskaiia, T.I., Methodological Problems in the Study of Migration of Rural Population, in *Statistika migratsii naseleniia* (Population Migration Statistics), Statistika, Moscow, 1973, 138 (in Russian).
- [6] Breev, B.D., Population Mobility and Formation of Manpower Resources, in *Problemy migratsii naseleniia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), Statistika, Moscow, 1970, 30 (in Russian).
- [7] Khorev, B.S., T.K. Smolina, A.G. Vishnevskii, Commuting in the USSR and its Study, in *Problemy migratsii naseleniia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), Statistika, Moscow, 1970, 100-101 (in Russian).
- [8] In most socialist countries of Europe, commuting is more widely studied. Pivovarov writes about this in his article "Commuting in the Socialist Countries of Europe," in *Problemy migratsii naseleniia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), Statistika, Moscow, 1970, pp. 113-121. Commuting in Poland is discussed in an article by G. Mortimer-Shimchak in "The Methodology and Results of a Study on Work-Related Travel in Poland," in *Statistika migratsii naseleniia* (Population Migration Statistics), Statistika, Moscow, pp. 317-333. Both articles are in Russian.
- [9] In *Problemy migratsii naseleniia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), Statistika, Moscow, 1970, 100-109.

- [10] *Ibid.*, 109-112.
- [11] In *Statistika migratsii naselenia* (Population Migration Statistics), Statistika, Moscow, 1973, 80-98.
- [12] Khorev, B.S., T.K. Smolina, A.G. Vishnevskii, *op. cit.*, 100.
- [13] In our opinion the number of commuters is significantly larger; data is introduced by the authors and taken from the article of V.G. Davidovich, "On Inter-connected Settlement in Urban Agglomerations, in *Gradostroitel'stvo i raionnaia planirovka* (City-Building and Regional Planning), Budivel'nik, Kiev, 1967 (in Russian). In connection with the growth of urbanization, the increase in the number of agglomerations and their growth, the number of commuters at the present time is probably significantly larger.
- [14] The rural population commuting coefficient is the ratio of the number of rural inhabitants employed or studying in urban areas to the entire rural population, taken per 1000 of the rural population.
- [15] Khorev, B.S., V.M. Moiseenko, eds., *Migratsionnaia podvizhnost' naselenia v SSSR* (Migration Mobility of the Population in the USSR), Statistika, Moscow, 1974, 110.
- [16] *Ibid.*, 111.
- [17] As already indicated, an accounting of commuting trends for the Population Census of 1970 was carried out in 107 cities and 445 suburban areas.
- [18] *Problemy migratsii naselenia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), Statistika, Moscow, 1970, 100-101.
- [19] In the Soviet literature in the field of economics the most widely accepted classification of cities is the following based on size of population: "major" cities -- over 500,000, "large" cities -- 250,000 to 500,000, "big" cities -- 100,000 to 250,000, "medium" cities -- 50,000 to 100,000, "small" cities -- up to 50,000. This grouping basically reflects the present stage of development of the network of urban settlement. This system, however, has several drawbacks which relate primarily to the apportionment of small cities. See B.S. Khorev, *Problemy gorodov (urbanizatsiia i edinaia sistema rasseleniia v SSSR)* (The Problems of Cities:

Urbanization and a Unified Settlement System in the USSR), *Mysl'*, Moscow, 1975, 144-151.

- [20] *Problemy migratsii naselenia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), *Statistika*, Moscow, 1972, 104.
- [21] Khorev, B.S., *Problemy gorodov (urbanizatsiia i edinaiia sistema rasseleniia v SSSR)* (The Problems of Cities: Urbanization and a Unified Settlement System in the USSR), *Mysl'*, Moscow, 1975, 341.
- [22] *Ibid.*
- [23] Khorev, B.S., V.M. Moiseenko, eds., *op. cit.*, 121.
- [24] Davidovich, V.G., *Rasselenie v promyshlennykh uzlakh* (Settlement in Industrial Centers), Moscow, 1960, 185.
- [25] Khorev, B.S., V.M. Moiseenko, eds., *op. cit.*, 117.
- [26] *Ibid.*, 118.
- [27] In the USSR "commuter tickets" may be purchased by commuters at a cost which, when broken down on a single-trip basis, is so low as to be merely a token charge.
- [28] Khorev, B.S., V.M. Moiseenko, eds., *op. cit.*, 120.
- [29] *Problemy migratsii naselenia i trudovykh resursov* (Problems of Population Migration and Manpower Resources), *Statistika*, Moscow, 1970, 107.



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