Housing and Public Services in a Medium-Sized Russian City: Case Study of Tomsk

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Abstract: A team of Russian and American urban specialists examines variations in living conditions across 26 microrayons of a medium-sized West Siberian city (Tomsk, 2002 population of 487,700) deemed to be fairly typical of urban settlements in that size class. Detailed information derived from the mapping of intra-urban variations in housing type and age, health facilities, schools and other educational institutions, and access to public transportation is used to construct three public service indices representing the relative level of deprivation of urban residents. *Journal of Economic Literature*, Classification Numbers: D32, I32, O18. 9 figures, 2 tables, 17 references.

INTRODUCTION

Under the Soviet system, housing in cities was centrally planned, built, allocated, owned, and maintained. Since housing was provided at little or no cost, demand far outstripped supply, and people waited for decades to receive a new housing unit (Smith, 1996). Although residential differentiation under the Soviet regime was much less drastic than in Western countries, some differentiation did exist (e.g., Bater, 1980, pp. 102-111; Smith, 1996). Generally, among the best housing was that used to reward especially meritorious workers, ranging from skilled specialists to Party nomenklatura; these elites more often than not were situated in central parts of the city in higher quality housing stock. Cooperative housing, which required some self-financing, was inhabited by those with relatively higher incomes. Ranking slightly lower in the housing hierarchy were blocks of apartments administered by municipalities, followed by flats built by enterprises to house their workers, and individual housing (often older structures lacking either indoor plumbing or electricity and located on the urban periphery).

In addition, housing quality tended to vary significantly by age of construction. Since large housing blocks in Soviet cities were constructed to form new urban districts (*mikrorayony*) at roughly the same time, this also contributed to the spatial variation of housing by location.

Following the collapse of state socialism, the advent of housing markets has resulted in increased residential differentiation. Prices for well located (i.e., central) and higher quality

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Apartments have increased much more rapidly than prices for poor quality and poorly located units. Thus, not surprisingly, more affluent people who privatized well located and larger units in better-served areas obtained more valuable assets than did residents of collapsing villages, small cities, or polluted, crime-ridden, and/or distant areas of larger cities. Since housing maintenance, heating, and other subsidized services are provided on a per square meter basis, owners or tenants in larger apartments de facto received higher subsidies. Aver-
age housing prices per square meter in Tomsk, which provides the case study for this paper, in December 2003 (12,000 rubles or ca. $418 U.S.) generally resembled those of other cities in Western and central Siberia—Novosibirsk 16,310 rubles (ca. $568), Omsk 11,063 ($385), Barnaul 12,200 ($425), and Krasnoyarsk and Kemerovo 11,800 ($411). Conversely, those in dying single-enterprise towns or outlying districts of cities in Tomsk Oblast struggled to sell their apartments for as little as a few thousand dollars in June 2003.

In this paper, we observe that because the poverty rates in relatively prosperous cities (such as in the capitals of Russia’s 89 regions) are smaller than in other places, little attention is paid to these cities’ poor, who must contend with multiple types of deprivation. Using the city of Tomsk as a case study, we look at emerging areas of multiple deprivation where households live in poor-quality housing (often under isolated conditions) with generally limited access to jobs and services. With the introduction of housing markets, these areas are the least desirable and most likely to become slums.

We believe that this study is significant because it provides an alternative approach to identifying and assessing these blighted areas by conventional survey methods. Local authorities generally do not have the financial resources necessary to conduct household surveys at the level of small communities or individual cities. In this paper, we attempt to demonstrate how the tools of spatial analysis (such as the mapping of dilapidated housing) incorporated within a geographic information system (GIS) can improve our understanding of social risk area. The results suggest the wisdom of adopting different planning strategies for different parts of the city. We apply an index-based approach to assessing the quality of life in relatively small urban areas (mikrorayony) that can be used to track progress in addressing welfare issues in poor and high-risk neighborhoods.

We posit here that the city of Tomsk provides a reasonable choice for such a case study, as it can be viewed as a fairly typical regional capital in Russia. Although the northern rayons of Tomsk Oblast fall within the region designated as the North (e.g., Slavin, 1972; Bradshaw, 1995, p. 196), for which residents were (and to some extent still are) eligible for wage increments, bonuses, and other benefits, the bulk of the region including the regional capital is not. Tomsk has a climate that is not extreme by Siberian standards, and its rural hinterland supports a diversified agriculture. The city was founded in 1604 during the Russian Empire’s late 16th–early 17th century push to the east, as were many other Siberian capitals with 250,000–500,000 inhabitants (e.g., Kurgan, Ulan-Ude, and Chita; Goskomstat Rossii, 2004), and together with nearby Tyumen’ and Tobolsk, dominated urban life in southwestern Siberia until nearly the end of the 19th century (e.g., see Lydolph, 1977, p. 389).

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2These data were obtained by the authors from real estate agencies in Tomsk (Privat realt), Omsk (MIEL), Barnaul (Dom), Novosibirsk (Doktor Klyuch), Krasnoyarsk (IZHI-ANNO), and Kemerovo (Institute of Realtors).

3Information on selected 2003 prices was communicated to the authors by Tomsk Oblast officials.

4For the purposes of this study, “slums” are places where the poor are concentrated in substandard housing with inadequate services.

5Agriculture in the city’s hinterland typically is focused on dairying, other forms of livestock husbandry, and wheat (largely spring-sown), rye, barley, flax, and potato production (Geograficheskii, 1989, p. 483).
Trans-Siberian Railroad to the south in the late 1800s, it stagnated relative to more recently established towns through which the mainline passed (e.g., Omsk, Novosibirsk). More recently, Tomsk has rebounded as a result of the completion of a 100-km rail spur connecting it with the Trans-Siberian, and the development of the West Siberian hydrocarbon deposits from the 1970s onward. A large share of Tomsk Oblast’s population (ca. 48 percent) resides in the city, as is typical of other Russian regional capitals (Koehn et al., 2001). Also typical is the fact that the economy is rather diversified. Tomsk’s economy encompasses a variety of activities typical of administrative centers not only of Siberia but of the country as a whole: construction, transportation, finance, banking, electrical machinery, and petrochemicals.

In addition to being typical with respect to its economic profile and early history of colonization, Tomsk has been shaped by the same general trends affecting Russian cities as a whole during the Soviet period and initial years of Russian independence. The city weathered the forced industrialization in the first half of the 20th century, the post-World War II housing boom featuring prefabricated construction, and more recently economic decline and population loss (1990s) associated with Russia’s painful post-Soviet economic and social transformation.

Finally, we argue here that Tomsk is a typical settlement in its size class (medium-sized cities of 100,000-500,000 population) with respect to housing conditions. Medium-sized cities experienced three waves of population expansion during the 20th century, when they grew at far higher percentage rates than larger or smaller cities. The first wave occurred during industrialization, between 1926 and 1939, when the number of medium-sized cities almost tripled (from 18 to 48), and their population increased from 2.8 to 10 million. During the second wave, from the end of World War II until 1959, medium-sized cities grew rapidly as the result of the focus on restoring the country’s economy. By 1959, the population residing in this size category burgeoned to 15 million. The final, third period of rapid growth of medium-sized cities was in the 1960s, when their population reached 23.3 million.

Because these waves of growth were linked to Soviet industrial development policies, and because urban housing was financed and built by the state, all rapidly growing cities ended up with similar housing stocks. During the “first wave” of urbanization, before World War II, state resources were committed to industrialization with relatively small amounts allocated for housing construction (e.g., see Bater, 1980, pp. 98-99). As a result, increasing numbers of people were housed in the existing stock such as wooden buildings, while hostels were built to accommodate new people. The second wave of rapid urban growth coincided with Khrushchev’s commitment to improving housing conditions by introducing standard designs and largely pre-fabricated construction methods. Constructed rapidly,

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6However, oil production in the Tomsk region is dwarfed by adjacent Tyumen’ Oblast, with Tomsk typically registering only 2 or 3 percent of the output of its western neighbor over the period from 1980 to the present (e.g., see Sagers, 2001, p. 161). Therefore its economy is much less dependent on hydrocarbon revenues, and less susceptible to the boom and bust cycles typical of that industry.

7Included in the city’s machinery manufacturing profile during the late Soviet period were the enterprises Sibkabel’, Sibeletromotor, and a number of other enterprises manufacturing ball bearings, lathes and other cutting tools, pressure gauges, vacuum tubes, and radio components (Geograficheskii, 1989, p. 483).

8Between 1965 and 1977, total apartment floor space in the USSR almost doubled (Bater, 1980, p. 105)

9The impact of the decline, however, has been less severe than in surrounding rural areas in the oblast and smaller urban centers with more monofunctional economies. In other words, as in other regional capitals, Tomsk’s diversified economy and concentration of managerial, commercial, and financial functions have somewhat reduced the hardship associated with the transition.

10About one-third of all urban dwellers in Russia reside in cities ranging from 100,000 to 500,000 in population.
Khrushchev-era apartments are found in all Russian cities. Poorly designed and shoddily built, the decay of these units is an important social problem not just in Tomsk (see below), but in every other Russian city. By the 1960s and 1970s, and the third wave of urban growth, housing quality had improved somewhat as a result of improved standard designs and modular components (so-called “large-panel construction”); however, standardization came at the expense of individuality, as Russian cities became increasingly similar in terms of their internal morphology (“urban fabric”; see French and Hamilton, 1979).

The paper is organized in four sections. The first outlines the methodology and identifies sources of information used in the study. The second focuses on the compilation of large scale maps of the city of Tomsk and the insights that they provide, while the third describes the index-based assessments of the mikrorayony. The final section briefly notes some of the implications of this study.

METHODOLOGY AND DATA

The city of Tomsk is divided into four administrative districts (or rayons), which are relatively equal in terms of population—Leninskiy, Oktyabr’skiy, Sovetskiy, and Kirovskiy (Fig. 1). All four rayons cover large areas and are quite heterogeneous in terms of their housing stock, presence of industrial enterprises, availability of transportation, and the location of schools and healthcare facilities. Given the heterogeneity and large size of the rayons, we have opted to utilize statistics for smaller areas of the city, the so-called mikrorayony (or microrayons). While the latter are the basic building blocks of Russian cities, they are not formal administrative units. Usually they are areas housing some 4,000–20,000 residents, forming around enterprises, historical sections of cities, sites of large-block apartment construction in the 1970s and 1980s, outlying (but distinct) districts, and former villages incorporated with the city. Microrayons are natural areas in the sense that people refer to them when they describe where they live.

The average population of a microrayon in Tomsk is about 18,000. Those with the largest populations were constructed during the 1970s and thereafter, since the buildings there are all multi-storey and usually clustered quite densely over space. Tomsk city is divided into 26 such areas (Fig. 1).

In order to compensate for the lack of survey data derived from door-to-door interviews of residents, specialists from Tomsk Polytechnic University developed a Geographic Information System (GIS) that included information on population, transportation, location and quality of housing, location of industry, and physical features such as rivers and green space. These spatial data were used to identify the spatial distribution of education and healthcare facilities, transportation, housing type and quality, and industrial areas across the city’s microrayons. By examining closely the locations of these facilities, it was possible to identify areas that are underserved or where the housing stock is of poor quality. It is also

11The largest is Oktyabr’skiy, with a population of roughly 134,500, whereas the smallest is Sovetskiy (107,400) (see Rayony, 2002).

12Data used in the GIS were compiled largely from municipal government records. Thus, information on transportation routes were provided by the Tomsk Department of Transportation, on industrial enterprises by the city’s Department of Industry, and on housing by the city Housing Department. Initial data on health care and educational facilities were provided by the eponymous departments of the city administration, and were supplemented and updated with information derived from the Yellow Pages and reference guides (primarily on private facilities). Finally, population data for city rayons and microrayons were made available by the Tomsk Oblast Statistical Committee as estimates.
possible to see that within each of the four rayons, there are microrayons that are spatially isolated, separated from the main part of the city by a string of enterprises or green space. Areas with inadequate basic services, where housing quality is substandard, and/or areas relatively distant from the rest of the city, are likely to house increasing concentrations of the poor and may well develop into slums, where poverty predominates.

In an effort to quantify some of the mapped data, we constructed three composite indices based on the information detailed below. Composite indices utilizing these variables were constructed in the following manner:13

(a) The index of transportation infrastructure is the weighted sum of: a measure of existing municipal transportation facilities (i.e., \( \text{Ind}[I_2 + I_3 + I_4 > 0] \)); the ratio of municipal

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13The weights of the three variables are equal, one-third each. When describing the calculation of the indices, the “ratio” is the index value of a particular microrayon divided by the maximum value of that index observed among all microrayons.
transportation lines (i.e., \((I_2 + I_3 + I_4)/\max(I_2 + I_3 + I_4)\)); and the ratio of private transportation lines (i.e., \(I_1/\max(I_1)\)). The value is multiplied by 100 to facilitate its interpretation.

(b) The index of medical infrastructure is the weighted sum of the private healthcare facilities ratio (i.e., \(I_5/\max(I_5)\)) and the municipal healthcare facilities ratio (i.e., \(I_6/\max(I_6)\)) multiplied by 100.14

(c) The index of educational infrastructure is a weighted sum of the following variables multiplied by 100: (1) the kindergarten ratio (i.e., \(I_{10}/\max(I_{10})\)); (2) the school ratio (i.e., \(I_9/\max(I_9)\)); and (3) the vocational training institution ratio (i.e., \(I_8/\max(I_8)\)).15

<table>
<thead>
<tr>
<th>Transportation, no. of lines</th>
<th>Medical services, no. of hospitalsa</th>
<th>No. of educational institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private bus (I_1)</td>
<td>Private (I_5)</td>
<td>Universities (I_7)</td>
</tr>
<tr>
<td>Municipal bus (I_2)</td>
<td>Municipal (I_6)</td>
<td>Colleges (I_8)b</td>
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<tr>
<td>Trolleybus (I_3)</td>
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<td>Elementary and secondary schools (I_9)</td>
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<tr>
<td>Tram (I_4)</td>
<td></td>
<td>Kindergartens (I_{10})</td>
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aIncludes both walk-in clinics and specialty hospitals.
bInstitutions providing higher vocational education.

Using this set of indices, we developed a microrayon “scorecard” that also pointed to some conclusions with regard to areas of relative deprivation in the city. Over time, we expect to find increasing concentrations of the poor in these areas, as inhabitants with resources will move out and be replaced by the less well off.

MAPPING THE CITY OF TOMSK

Housing

Figure 2 shows the density of apartments in dilapidated buildings, with the areas of darkest tone representing neighborhoods with the greatest number of such apartments. Every dilapidated building16 was included in the data set, along with the basic characteristics of the building, namely location, number of flats, age of construction, material of walls, and level of deterioration. The majority of apartments in run-down buildings are found in the older areas of the city center, but pockets of dilapidated buildings also are present in other parts of Tomsk, often near industrial areas.

In order to gain a better understanding of the underlying patterns, the buildings were assigned to three categories by age of construction, which also differ in terms of construction materials, degree of depreciation, availability of modern conveniences, and degree of crowding. Looking at these groups individually helped us to understand where “horizontal” slums of single-family housing or “vertical” slums of multi-story apartment buildings are most likely to emerge in the city.

14The two ratios are weighted one-third and two-thirds of the total, respectively. We were unable to segregate the data between primary care units (ambulatory clinics) and specialized hospitals, so that our results are somewhat distorted, especially in the case of private facilities, which frequently do not offer primary care services to the population.

15The weights assigned to each variable are one half, one-third, and one-sixth, respectively.

16In this study a “dilapidated” unit is one officially categorized as such by the City Housing Department.
The first group consists of buildings constructed before the 1917 revolution, when the city was much smaller (Fig. 3). The buildings typically are small and range in size from 1 to 35 apartments. Most are centrally located, rather attractive two- to three-storey wooden houses shared by several families; they tend to characterize the architecture of central Tomsk. Inside, however, the residents of these houses paint a less appealing picture, reporting leaking roofs and the lack of modern conveniences, such as hot water. Some of the pre-revolutionary dilapidated structures are single-family dwellings usually not even

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17However, in only 5 of the 14 microrayons where such buildings are found does the number of apartments in a building exceed 20.
equipped with sewage disposal and possessing inferior electrical wiring and connections. Built only of wood, they comprise fire hazards that are difficult to renovate.

Pre-revolutionary dilapidated individual houses also are more likely to be inhabited by households with limited means. Moreover, these smaller and older dwellings are located close to each other. Microrayons 7, 11, and 12 have a fairly large share of this housing stock, accommodating not only 60 percent of all pre-revolutionary dilapidated buildings, but also 64 percent of all apartments in such buildings from that era.

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18A household survey covering the entire oblast, conducted by the Tomsk Regional Statistical Committee in 2002 with the consulting assistance of the Institute of Urban Economics, found that residence in an individual house in an urban settlement represents a welfare risk factor.
The second group consists of dilapidated buildings constructed between 1920 and 1944 (predominantly prior to World War II), during a period of industrialization and urbanization when Tomsk expanded to the north and somewhat to the south, developing areas where many present-day industrial zones are located. Houses constructed in the 1920s and 1930s represent a mix of individual wooden dwellings, brick or concrete high-rises (5 or 6 stories), and barracks. The number of run-down buildings dating to the pre-World War II period, rarely exceeding 10 units in size, is rather small (65).

Although the poor conditions of these units pose a problem for their occupants, the small size of the group does not pose a major problem for the city. As Figure 4 shows, the buildings are dispersed throughout the city. Houses on valuable land in the city center should be attractive to private investors, and sellers could use the proceeds to purchase relatively modern units elsewhere. At the same time, clusters of dilapidated houses in microrayons 19, 23, and 24 are of concern, and are unlikely to attract new investment.19

The third group of dilapidated buildings was built since World War II. It consists of buildings termed as “Stalin,” “Khrushchev,” or “Brezhnev” apartment blocks (Fig. 4). Each name identifies not only the construction period, but also the apartment designs and construction materials. The Stalin buildings usually are of brick, with high ceilings and spacious layouts. In large cities, Stalin buildings are much sought after. Khrushchev apartments, in comparison, are small, with low ceilings, thin concrete walls, and inconvenient apartment layouts (primarily in five-story buildings). Brezhnev buildings, generally taller and consequently with more units, were better laid out than their Khrushchevki counterparts, and somewhat larger, although not as large as apartments in Stalin buildings.

Despite the differences, grouping the three types of buildings makes sense because they share important similarities. All buildings house many apartments, they are equipped with modern conveniences, concrete (not wood) is used to separate the floors, and their present condition depends to a great extent on their pre-reform ownership status. The latter means that buildings previously owned by richer, large enterprises or by regional government agencies are likely to remain in relatively good condition compared to those owned by smaller enterprises or the municipality.

Closer analysis of buildings in the above group suggests that they are less diverse than it appears at first glance. In fact, most were constructed in the 1950s and 1960s and belong to the Khrushchev type noted earlier. These low-quality buildings were constructed quite rapidly, were expected to be used for no more than 25 years, and have deteriorated so greatly that most large municipalities have prioritized them for demolition and reconstruction.20 In fact, most pockets of densely concentrated flats in dilapidated buildings outside the center of Tomsk are linked to concentrations of Khrushchevki, inasmuch as only 11 out of the 248 dilapidated buildings erected during this period were constructed after 1965.21

Given all of the above, one would expect housing prices to differ on the basis of housing quality and location. The cheapest units are a part (approximately one quarter or a third) of an individual house that does not have all conveniences. Housing in very poor locations may not even constitute a liquid asset, and even when saleable, prices are very low compared to

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19These are urban areas that present social risks associated with concentrations of poor quality housing and impoverished residents.

20See, for example, materials from the Second and Third International Congresses on Modernization of the First Series of Mass Construction Housing and Engineering Infrastructure of Cities (Modernization, 2003).

21For example, microrayon 17, built in the 1960s to house enterprise workers, has not been maintained since its transfer to the municipality. Although not very old, and still rather modern-appearing, its buildings are quite shabby.
A one-room apartment (36 m², or not quite 400 ft²) in a nine-storey brick building in Sovetskiy Rayon may cost from $10,000 (U.S.) (eastern part of Altayskaya Street) to $21,000 (central part of Frunze Avenue) simply due to differences in location.23 Costs also vary substantially by type of housing, suggesting that the emerging areas of undesirable housing are likely to be inhabited by the poor.

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22Indeed, microrayons 16, 21, and 23 are identified with the lowest housing prices in the city. The price of a two-room *Khrushchevka* in these areas may vary between 280,000 rubles (Novaya Street, remote periphery) and 550,000 rubles (Usova Street, downtown area, parallel to Kirova Prospekt; http://privat.tomsk.ru/info.asp).

23Costs also vary substantially by type of housing, suggesting that the emerging areas of undesirable housing are likely to be inhabited by the poor.
Vulnerable Location and/or Inadequate Service Provision

The desirability of a given microrayon is determined not only by the quality of housing stock, but also by its integration into the city as a whole, proximity to noxious factories, and access to transportation and social services. Problematic neighborhoods or areas usually are isolated, adjacent to industrial enterprises, or otherwise poorly connected to the rest of the city.

Four microrayons are physically remote from the rest Tomsk, as shown in Figure 1. On the west, microrayon 25 is separated by the river. Although it is formally a part of the city, living standards and opportunities there seem to resemble most closely those of the adjacent rural rayon. Without a bridge or public transportation, residents of 25 are cut off from the city. The nearest tram line is to the south and the nearest bridge is even farther south. Only one small country road connects this area with the rest of Tomsk. Microrayons 17, 8, and 26 in the southeast also are spatially isolated from the rest of the city by green space, and rank in the bottom quartile of the city’s microrayons in terms of access to transportation (see below).

Other microrayons are spatially isolated by a railway line, which crosses the eastern part of Tomsk from north to south (Fig. 5). Several pockets of dilapidated housing are found next to the railroad in microrayons 19 and 23 adjoining the railroad, which serves as a physical barrier effectively cutting off microrayons 1, 2, 3, 22, and 23, as well as parts of 13 and 19.

Industrial areas also may isolate residential communities from the fabric of the city. In Tomsk, as in other centrally planned Russian cities, the absence of land markets during the Soviet period resulted in a lack of correspondence between land use and land values. Once a factory was built, recycling the land for other purposes was not practical, since land could not be sold and land use regulations were quite rigid.

Most factories and enterprises are concentrated in four rather large industrial areas, which surround the city on all sides except along the river (Fig. 5). Notionally, they may be defined as Northeast (microrayons 19 and 23), Northwest (16 and 24), Southeast (2, 9, and 10), and Southwest (4, 5, and 7). The location of the river and industrial enterprises makes physical expansion difficult. Northern and eastern areas house a mix of industries producing everything from equipment to pencils, rubber shoes, bread, and chocolate. The large group of factories in microrayon 16 (and to a lesser extent 24) are known polluters that block peoples access to the river, so that its banks cannot be upgraded and used for recreation.

Another group of polluting factories is found in the northeast in microrayons 19 and 23, including the Tomsk asphalt factory and plants for construction and composite materials. These factories adjoin the railway, which seems rational until one realizes that residential areas in microrayon 23 are surrounded by factories and cut off from the city. To the south, artificial lakes built as wastewater receptacles for nearby enterprises serve as a physical barrier for residential areas in microrayons 13 and 9. These lakes (ostoyniki in Russian) create problems for nearby residents in the spring, when they flood the surrounding areas. Additionally, enterprises that dump water in the lakes fail to treat it properly, creating environmental problems.

Enterprises in the southeastern part of the city generally serve the needs of the construction industry. The southeast also houses a large power generation plant and telegraph/telephone stations. More recently, smaller factories have appeared in this area, clustering around the largest. Most of the city’s electromechanical and machinery manufacturing enterprises are concentrated in the southeast, especially in microrayons 2, 9, and 10.

From a residential point of view, the smaller factories (such as shoe or lamp makers in microrayons 4 and 7) are less problematic because: (1) many are not operating at full capacity due to reduced demand for their products; (2) they are not as heavily polluting; and
(3) they are not concentrated as densely as in the other industrial zones, which makes development of nearby residential areas easier.

The fact that a city as small (relatively speaking) and compact as Tomsk has four major industrial areas seems excessive with regard to its impact on living conditions for residents and development of housing markets, recreational areas, and other urban facilities. Many industrial enterprises in present-day Tomsk date from the evacuation of enterprises from European Russia to Tomsk and other remote locations during World War II (Pronin, 1962; Isupov and Moskovskiy, 1984). During that time, not much attention or importance was given to the physical location of the evacuated factories within the city, but the result is that today the city is encircled by factories.24

24Not surprisingly, given the location of industrial areas in the city, no part of Tomsk can be considered environmentally clean.
Several microrayons are either “locked” between industrial areas or separated by them from the rest of the city. Industrial areas isolate residential areas in microrayons 1, 2, 3, 23, and parts of 16. The dispersion of industrial areas throughout the city means that only residents in the five outlying microrayons (1, 26, 8, 17, and 25) and the three central microrayons (12, 11, and 14) do not reside in the immediate proximity of industrial enterprises.

Offices and service providers are more evenly distributed than enterprises, although higher concentrations are found in the central microrayons (12, 14, and 15) and near the southeastern industrial zone. Microrayon 14, in the city center, in addition to residential uses, houses only offices, including those of the main petrochemical companies operating in the oblast, and those of administrative authorities.

At this point, some observations about the status of specific microrayons in Tomsk are in order. Microrayon 1 has no factories, no service companies, and no offices. It is remote and its housing stock is of poor quality. This is likely a neglected neighborhood where poor people live. On the other hand, microrayon 22 also does not have any factories, but its housing consists of higher-quality, multi-story apartment buildings, and it has schools, kindergartens, and other facilities for residents. A typical residential area, or “bedroom community,” its residents work and socialize elsewhere.

Transportation

The existing transportation system does not compensate for spatial isolation. In fact, spatially isolated microrayons are less served than better-located microrayons. Figure 6 depicts microrayons with the most limited access to transportation in the lightest tones. These include areas 1, 26, 8, 23, and 25. Microrayons shown in a medium shade of grey are better served. They include most of the industrial and other areas adjoining the downtown area; the latter is depicted in a dark shade signifying the best transportation access.

Public transportation proper plays only a small role in the city’s transportation network. A limited number of municipal buses cover the very center of Tomsk (microrayons 12 and 14), and several tram lines crisscross the city, covering an area from the southern outskirts (microrayons 2 and 4) to microrayon 17 in the east, and even crossing the river on the west. Trolleybuses serve the center and to some extent the north and northeast, but many remote residential areas are connected by at most one or two lines of public transportation. Fortunately for many city residents, private buses and minibuses supplement the public transportation system. Currently, private transit providers serve nearly every microrayon. Thus, of the 33 transportation lines in the city, nearly one-half (16) are private bus lines, whereas 5 are municipal bus lines, 7 are trolleybuses, and 3 are trams. Most passengers ride private buses, which both cover a larger area and are more frequent—especially when compared to public trams and trolleybuses, which do not always function in the winter and are often delayed for an hour or longer. Private buses cost more (5 rubles per ride instead of 3.5 in public buses and 3 rubles on other public carriers), but only a few users are eligible to ride for free.25

25These include World War II veterans, survivors of the Leningrad blockade, and Heroes of the USSR. The shrinking city budget prompted the cancellation of privileges for most other groups, notably the disabled and pensioners.
Access to Health Care and Educational Facilities

A look at the location of key social facilities (schools, preschools, and health clinics) in different neighborhoods again reveals salient spatial differences. Two trends emerge in terms of the location of educational facilities. First, the more remote microrayons are the least well served by preschools, schools, and vocational schools, as evidenced by a map of the index of educational infrastructure (Fig. 7). The spatially isolated microrayons 1, 26, 8, and 25 stand out for the total absence of preschools, and possess either no (microrayons 1 and 26) or one primary or secondary school (8 and 25). The next tier of microrayons is slightly better off, with two to four preschools and primary/secondary schools; these include areas 3, 2, 5, 23, 13, 19, 17, and 21.

The second trend indicates that microrayons consisting primarily of multi-story apartment buildings have better access to preschools and schools than do those comprised of
single-family homes. As expected, areas of more recent construction are more likely to have been built according to city development plans that provided for construction of educational facilities. The analysis cannot be considered foolproof, inasmuch as we do not know how many people live in each microrayon, but a comparison of school location patterns with type of residential buildings suggests that older areas where buildings are smaller are less well served than are those of more recent construction dating from the 1970s and later.

In general, educational facilities are not found in outlying areas where housing is dilapidated. On the one hand, this situation may be good in the sense that preschools and schools are not located in run-down and potentially dangerous buildings. On the other, people residing in run-down areas of the city face an additional burden since they must travel considerable distances in order to send their children to either preschools or schools. Single mothers especially may not be able to work because childcare is not easily available.

26For example, note the low level of educational facilities in microrayons 21 and 23, and the high level in microrayon 22, which is a bedroom community.
Overall, Tomsk residents are well off with regard to health care facilities. The city has three basic levels of hospitals: clinical (mostly regional), city, and district hospitals (municipal). The three levels differ in terms of medical specialization, financing, and kinds of services provided. Generally speaking, more expensive and specialized care is provided at higher levels. As a regional center, Tomsk has both clinical and city hospitals, which offer a variety of services, such as psychiatric care, orthopedic surgery, HIV/AIDS prevention and treatment, and several specialized hospitals for children.

Although people are willing to travel longer distances to access specialized care, primary care facilities should be relatively evenly distributed. But analysis of the location of general (multi-service, primary) health care units that provide ambulatory care shows they are quite unevenly distributed. In fact, the spatial distribution is similar to that of schools and kindergartens. Again, residents of certain microrayons have better access to primary health care than others.

In the north, only one municipal polyclinic serves the adjoining microrayons of 16, 21, and 24 (Fig. 8). Microrayons 17, 1, 13, and 23 have no health care facilities, and microrayons 8 and 26 have only one clinic. Private clinics mushroomed in the late 1990s and are found in most microrayons. Many private clinics offer dental services, but in the downtown area, such clinics also offer either services for the entire family or specialized services in pre-natal and neonatal care. Private health care providers are not found in remote industrial neighborhoods where the population is likely less well off.

MICRORAYON SCORECARD

Based on the transportation, medical, and educational indices described above, it was possible to compile an aggregate microrayon “scorecard” summarizing variations in well-being as measured by the mapped data. In order to simplify the data, the three indices were ranked and then summed to create the average rank for all three indices. A map showing the distribution of this scorecard (average ranking) reinforces our observations that remote neighborhoods in northwestern, eastern, and southeastern Tomsk are worse off with regard to housing as well as public services (Fig. 9). The pattern of covariation visible on the map can be verified statistically by producing a correlation matrix for the three indices (Table 1), which are significantly correlated.

The raw data table of transportation, education, and medical care infrastructure scores for each microrayon (Table 2) shows that outlying areas (microrayons 1, 26, 8, 17, and 25) all score at the bottom, a not unexpected result. In other words, the poorly located microrayons with few health or educational facilities and substandard housing are spatially coincident with those least served by public transportation, despite the fact that their residents also are most likely to be dependent on such transportation. Microrayons 23 in the northeast and 21 in the north also rank at the bottom. Microrayon 21 adjoins a major industrial area and consists primarily of single-family dwellings with a high concentration of dilapidated housing. Microrayon 23, with similar housing, is surrounded on three sides by industrial enterprises. In contrast, the best-provided microrayons are found in the center of the city, with the exception of microrayon 22, a bedroom community of relatively recently constructed multi-family apartment buildings.

In the Russian system, the federal, regional, and municipal levels of government are each responsible for different kinds of health care.
Table 1. Correlations among Indices of Transportation, Medical, and Educational Infrastructure

<table>
<thead>
<tr>
<th>Index</th>
<th>Correlation and significance</th>
<th>Transportation infrastructure</th>
<th>Medical infrastructure</th>
<th>Educational infrastructure</th>
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<td>.022</td>
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Fig. 8. Values of the index of medical infrastructure by microrayon.
One of the readily apparent conclusions of this study is that not only do the location and type of settlement have implications for the welfare of urban residents (e.g., see World Bank, 2000; Spryskov, 2002), but a household’s location within a city also is important. An urban household’s ability to balance and even out its consumption of essential goods and services depends on the value of assets that in turn are influenced by spatial factors (see Koehn et al., 2001).

The case of Tomsk reveals that residential neighborhoods with the lowest quality of housing (often single-family homes) and access to public services are located far from the city center. These microrayons more closely resemble “industrial villages” (i.e., settlements of urban type—*posyolki gorodskogo tipa*)28 than more developed parts of the city. The

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28Although designated formally as “urban” and containing three- to five-storey apartment buildings to accommodate workers of factories that provide their raison d’etre, these settlements are decidedly rural in character.
situation in Tomsk indicates that, following the introduction of housing markets after the fall of the Soviet regime, poor residents (i.e., those least able to afford the high costs of accommodation in the city center or more recently constructed bedroom communities) have increasingly been concentrated in neighborhoods characterized by a combination of substandard housing, inferior services, and remote location. This admittedly simple observation points to the need for similar studies in other relatively old Russian cities in a variety of size categories, in order to determine the extent to which this is an emerging post-Soviet phenomenon. Further comparative analysis also is warranted of the experiences of residents of deprived areas in Russia’s regional capitals with those in secondary settlements in which the

Table 2. Transport, Medical, and Educational Index Scores by Microrayon

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<th>Microrayon code</th>
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\(^a\)Rayon codes: 1 = Kirovskiy; 2 = Oktyabr’skiy; 3 = Leninskiy; 4 = Sovetskiy.

29For an assessment of emerging social polarization (e.g., income, housing, educational level) in post-Soviet Moscow, see Vendina (2002).
prevailing economic activity is not connected with lucrative raw material exports (e.g., oil). Research of this type has policy implications, in that it leads to the identification of the most vulnerable urban neighborhoods where poor people are likely to be trapped, thus facilitating the targeting of resources and other forms of assistance.

REFERENCES