

Onno Hoffmeister

**The Cost of Living and Real Income  
Differentials in Russia's Provinces**  
Evidence from the Russia Longitudinal  
Monitoring Survey

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# 1. Introduction

During the Socialist era food consumption was exceptionally cheap in Russia. Since prices for nutritional products were fixed at a level below the market prices in all Russian provinces, households did not face real difficulties in purchasing their basic nutritional needs. With the aim to smoothen regional income disparities and in accordance with the "doctrine of the compensation of the economic and social development level", large parts of the public budget were transferred from economically developed provinces to less developed ones. Thus, it was unlikely that large regional differences in the purchasing power of incomes appeared.

The situation changed in the aftermath of the Gaidarian reforms in 1992, when the system of central economic planning and controlled prices was dissolved. This paper investigates how regional income and cost of living differentials have developed ten years after the introduction of the reform programme. What are the factors that can be made responsible for differences in food prices and incomes? Have these differences increased or decreased during the second half of the 1990s? Such questions are not easy to answer, since it is difficult to obtain reliable Russian data on the two variables defining the 'real' value of income: the cost of living and nominal incomes. For the mid 1990s Hanson<sup>1</sup> describes the situation as follows:

"Regional differences in real personal income levels are exceptionally hard to measure. The raw data on incomes are full of gaps; unreported income looms large and is no doubt more important in some regions than others, and regional divergences in price levels are massive."

## 1.1 Previous Research

Due to these difficulties, studies on regional income differentials are scarce.<sup>2</sup> One exception is the comprehensive study on the structure of nominal wage and income differentials by Geishecker and Haisken-DeNew (2002) based on the Russia Longitudinal Monitoring Survey (RLMS) and the Russian Socio-Economic Transition Panel (RUSSIT). Unfortunately, they aggregate regions at a very high level, so that differences at the provincial level do not become visible. Furthermore, the authors do not consider the cost of living in the various regions.

The All-Russian Centre for the Living Standard (*Vse-Rossiiskii Tsentr Urovnya Zhizny*) derived data about the purchasing power of wages<sup>3</sup> and of incomes<sup>4</sup> in the 89 Russian prov-

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<sup>1</sup> Hanson 1994, 25.

<sup>2</sup> As in the course of the 1990s increasing inequality of incomes in the Russian society became more and more obvious, a number of studies focus on this issue without, however, considering the regional dimension. The Institute for Socio-economic Problems of the Population (Institut Sotsyal'no-Ekonomicheskikh Problem Narodonaseleniya), for example, provides important insights into the degree and origins of poverty within the society (Korostikova 1997). Klugman (1997) as well as Grub and Suprinovic (2002) present results from detailed poverty analyses on the basis of the Russia Longitudinal Monitoring Survey. Brainerd (1998) investigates wage inequalities using data of the All-Russian Center for Public Opinion Research (*Vse-Rossiiskii Tsentr Izucheniya Obshchestvennogo Mneniya*, VTsIOM).

<sup>3</sup> Men'shikova 1998.

<sup>4</sup> Saradzhyan 2001.

inces. The Expert Institute (1995) investigates regional socio-economic developments in Russia in the framework of a TACIT project which, among others, includes the investigation of incomes and their purchasing power. In these studies purchasing power parities are estimated on the basis of expenditures for a fixed bundle of nutritional goods associated with the minimum level of subsistence. However, this measure, which is provided by the official statistics of Goskomstat, does not take into account regional differences in consumer behaviour and the substitution effect in response to regional differences in relative prices. As a consequence, the index calculated by Goskomstat tends to over-estimate the differences in the real cost of living (see below, chapter 4.). The study at hand is based on a different measure of purchasing power parities. On the basis of data taken from the RLMS, a cost of living index will be derived using a method which is similar to that used by Eurostat and the Organisation for Economic Co-operation and Development (OECD) for international comparisons of income levels (see below chapter 4.2).

## 1.2 Design of the Study

The study distinguishes between two geographical levels of analysis. The upper level is comprised by the Russian Federation, the lower level by the 89 provinces<sup>5</sup> of Russia. More specifically, the focus lies on the economic sphere of both levels. The economy of the Russian Federation can be interpreted as an economic regional system, a finite set of locations with different endowments and connected by economic relations, as defined by Ritter<sup>6</sup>. The economies of the provinces are the units of analysis. They can be viewed as subsystems of the economic regional system of the Russian Federation.

The dependent variables are the real household income levels and the cost of living in the provinces. Real income is not directly observable. Rather, it is derived by deflating directly observable nominal income with cost of living. For the purpose of this study, the cost of living is measured in terms of the cost of food consumption. Real income is measured in terms of the quantities of food a household can purchase with its rouble income.

The cost of living and real income levels are influenced by a quantity of variables within their respective provincial economies and, indirectly, by variables belonging to the economy of the Russian Federation. Transport costs, the capital stock, the market, the endowment with natural resources and the location in space are supposed to be important independent variables. The following chapter will deal with the identification of the characteristics of these variables in Post-Soviet Russia. Accordingly, some background information about the historical roots of the Russian economic system will be presented. In chapter three the expected effects of these variables on provincial price and income levels will be derived from the perspective of Neo-classical Trade Theories, the Theory of the Central Places and the New Economic Geography. These three approaches have in common that they deal with geographical patterns of economic activity. Nevertheless, the first and the second ones have developed independently from each other within different theoretical disciplines: in Economics and in Geography. The New Economic Geography, by contrast, is a fairly modern school trying to connect the former with the latter.

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<sup>5</sup> In the text, the term 'province' will be used for the intermediate level of the geographical subdivision of administration in Russia. The 89 provinces include respublik, oblasti, kraii, avtonomnye okrugi and the cities Moscow and St. Petersburg.

<sup>6</sup> Ritter 1998, 52.



Before these theories will be applied to the regional cost of living and income disparities in Russia in chapter five, different methods of measuring cost of living differentials will be discussed in chapter four. On the basis of these considerations, an inter-regional Gini Eltetö Köves Szulz price index for food will be calculated in order to compare the cost of living in 32 Russian provinces. In chapter six, this index will be used to derive 'real' values of the nominal incomes stated by Russian households. These calculations will be made for the years 1995 and 2000 in order to observe the trend over time. Chapter seven will summarise the results and discuss open questions.

## 2. Economic Background

During the last decade, the economies of the Russian provinces have been subjected to substantial changes in the regional economic system of Russia which are often summarised under the term 'transformation'. This term reveals that the old stage has not been completely abandoned, while the new stage has not yet been reached. Although a large number of elements associated with a market economy have been introduced in Russia, several relics of the old system still exert a strong influence on economic developments. With regard to the geographical structure of the economy, important relics are the high level of regional specialisation and a regional clustering of industry. 'New' elements include the liberalisation of prices, the privatisation process, increased transport costs and disintegration. These will be reviewed below.

### 2.1 Regional Specialisation and Concentration of Industry in Soviet Russia

According to Stadelbauer,<sup>7</sup> the Soviet Russian economy had reached a high level of economic integration. Different products were typically produced at different places and traded across the country. The regions best suited for agriculture were located in the south-west, particularly south of a virtual line connecting Moscow, Kazan' and Chelyabinsk, as figure A-1 in the appendix demonstrates.<sup>8</sup> Regarding industrial production, the macro-economic regions Volga-Vyatka, Volga, Central, North-West and Ural were highly specialised in mechanical engineering, the Far-East and Eastern Siberia concentrated on non-ferrous metallurgy, Western Siberia on oil and gas, the North on timber and wood processing, Central Chernozem and North Caucasus partly on food, and partly on mechanical engineering. The centres of the high-technology industries were located predominantly around Moscow, but also in other locations plotted in figure A-2 in the appendix. Matsnev<sup>9</sup> observes that in the early 1990s the regions equipped with a large investment-goods producing industry, like Eastern and Western Siberia, the Urals, the Far East and the North, imported a high share of the food they consumed from the central and the southern areas.

In the Soviet Union industrial settlements were planned predominantly in the form of regional clusters. In their most extreme form the planners established so-called 'territorial production complexes' (TPC), forming a system of close interaction between companies within a region. The core of these complexes was made up of specialised companies producing basic materials and capital goods for the whole Soviet Union. In the surrounding area, a number of producers of supplementary and consumer goods settled. They absorbed the excess supply of workers from the specialised companies during periods of low production. It was the aim of the planners that the TPCs should serve as a fertile ground for further industrial settlements and workers and by that means promote economic development in the whole region.<sup>10</sup> Examples for TPCs include Kursk Magnetanomaly (Kursk, Lipetsk and Tula), the Kuzbass (No-

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<sup>7</sup> Stadelbauer 1996, 522-537.

<sup>8</sup> Ibid., 480-489.

<sup>9</sup> Matsnev 1996, 37-48.

<sup>10</sup> Cf. Stadelbauer 1996, 101-104; 505-521.

vosibirsk and Kemerovo), the Middle Ob (Khanty-Mansiisk) and South Yakutia (see figure A-3 in the appendix).

## 2.2 Price Liberalisation and Privatisation

In Soviet Russia decisions concerning the supply of goods were not based on market prices but on plans, predominantly passed at the highest level of political decision-making. Prices were meant to serve as nothing more than a means of expressing the quantitative goals of the plans when they consisted of different products.<sup>11</sup> However, producer prices had only a limited ability to regulate the economic activity as companies did not feel bound by hard budget constraints. As Kornai<sup>12</sup> points out, running a loss did not provoke a real danger for the survival of a company, and there were few incentives to make a profit. The money and credit supply was adjusted to the economic situation of the companies rather than the other way round. Consumer prices were used both as a means "to influence the demand of the population in the way those running the country consider desirable",<sup>13</sup> and for the purpose of income redistribution. Since they were set at the central level, consumer prices did also not reflect the demand and supply of goods. It was highly unlikely that regional differences in consumer prices could have emerged under these circumstances.

The situation changed in 1992, when prices were liberalised. Administrative price controls remained in force only for basic kinds of food, for rents, transport tariffs and different sorts of basic materials and energy. The *Statistisches Bundesamt*<sup>14</sup> estimates that at the end of 1992 about 80 percent of the consumer prices were determined by the market. In 1994, the responsibilities for price regulation were transferred from the federal to the local level.<sup>15</sup> Although a government order of March 1995 prohibited any kind of price controls unless a natural monopoly was identified, in 2001 prices for a variety of goods, predominantly for agricultural ones, were still under administrative control in many provinces. In half of the provinces the price for bread is still not allowed to exceed the cost of inputs by a fixed factor.<sup>16</sup>

The sudden price liberalisation had strong effects on inflation rates. The rate of the price increase differed from region to region. Thus, as figure 1 reveals, between 1991 and 2000 the relative increase in food prices in the Far East was by one and a half times higher than in the South.

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<sup>11</sup> Cf. Stadelbauer 1996, 101-104.

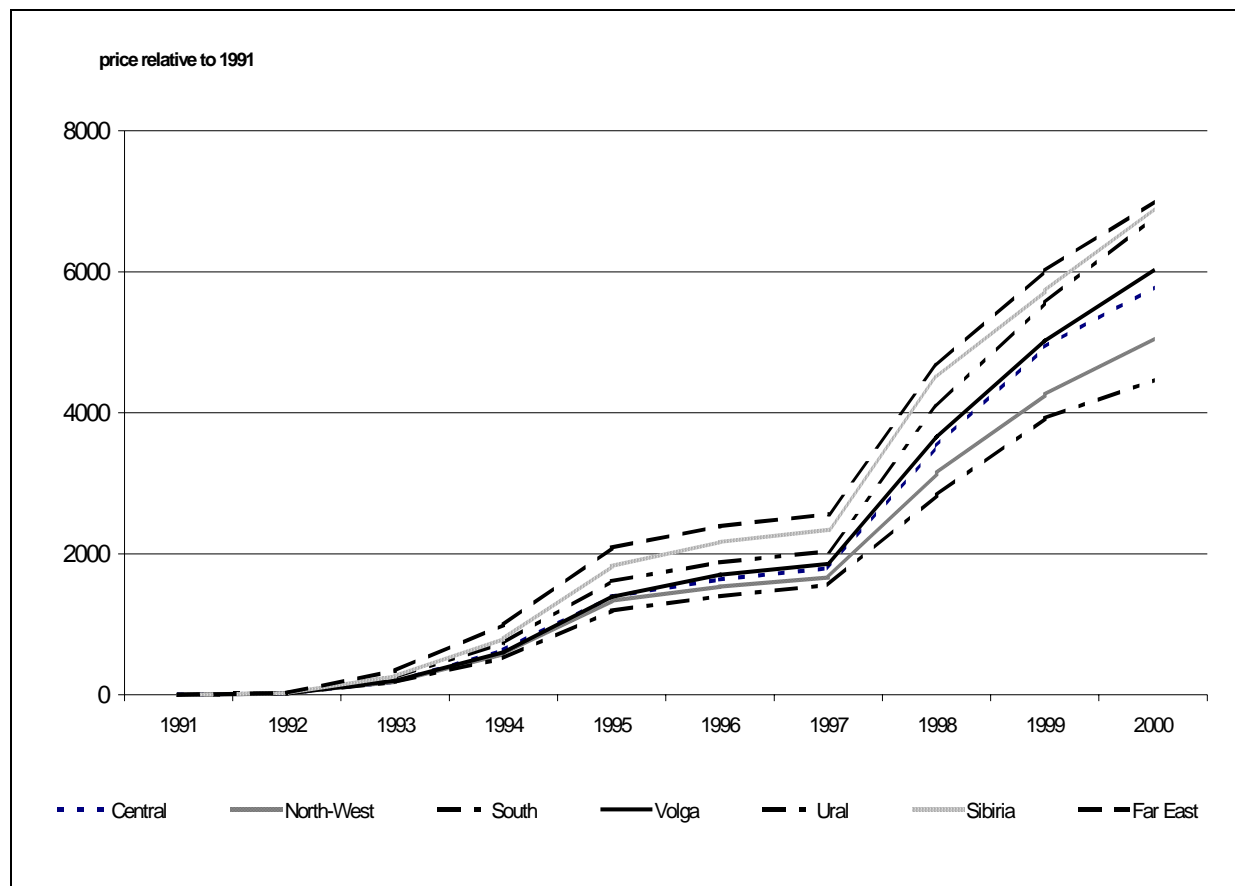
<sup>12</sup> Kornai 1992, 145-159.

<sup>13</sup> Ibid., 156.

<sup>14</sup> Statistisches Bundesamt 1996, 172.

<sup>15</sup> Cf. Sigmund 1997, 350f., Stadelbauer 1996, 113-115; 471-475.

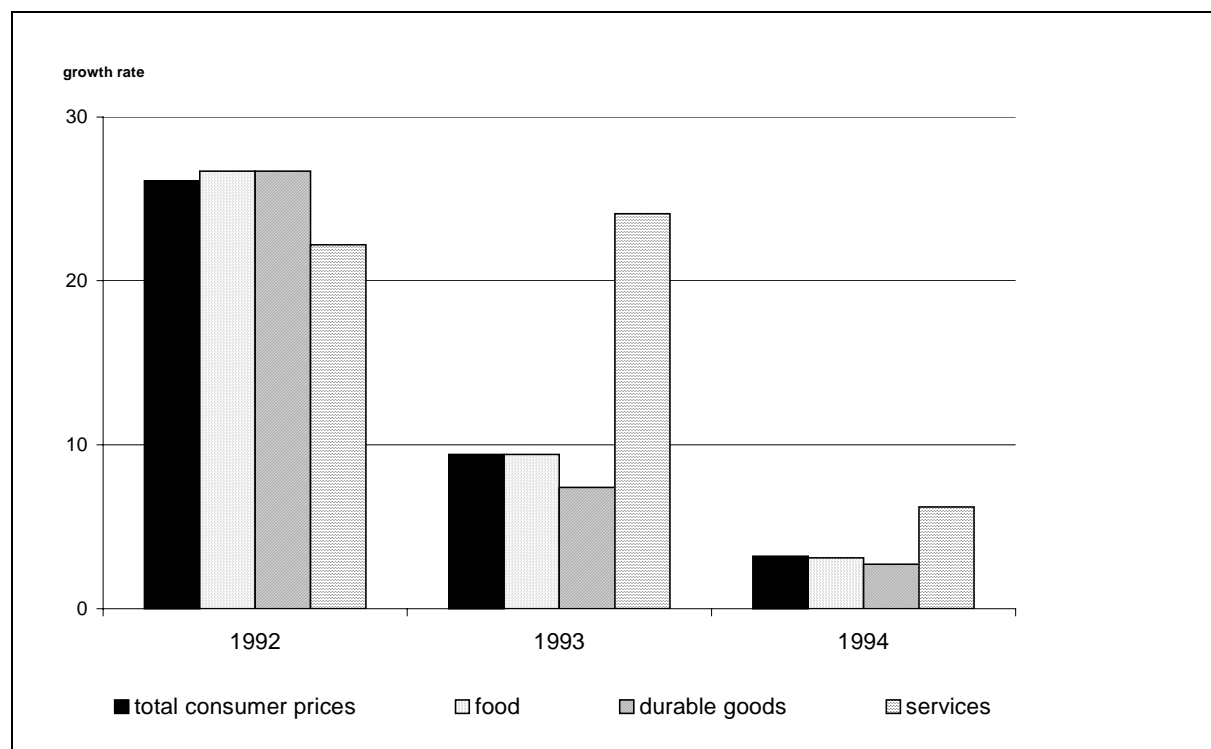
<sup>16</sup> Cf. Glazunova 2001.

**Figure 1: Development of Consumer Prices for Food in the Russian Regions.**

Source: Goskomstat,<sup>17</sup> own calculations.

Figure 2 shows that between 1992 and 1994 the growth of food prices approximately reflected the average development of all consumer prices. The prices of services grew extraordinarily fast, those of durable goods comparatively slow.

<sup>17</sup> Goskomstat "Regiony Rossii".

**Figure 2: Annual Growth of Consumer Prices in Russia.**

Source: Statistisches Bundesamt.<sup>18</sup>

Besides price liberalisation, privatisation was another important component of economic reform. In the context of the so-called 'small privatisation' during the Gorbachev era small enterprises were allowed to transform into co-operatives financed with the participants' private capital. Predominantly, retail and service companies made use of this opportunity. In the course of the 'big privatisation' in 1993, tradable certificates of participation (vouchers) were distributed to the Russian residents.<sup>19</sup> As in the course of the privatisation process the companies were increasingly confronted with hard budget constraints, the dominating medium of economic co-ordination changed from administrative control to decentralised self-regulation transmitted by the price mechanism.

### 2.3 Disintegration, Increased Transport Costs and Transport Prices

In the Soviet period, theoretical considerations concerning transport-cost-minimising locations played an important role in the plans for the huge industrial settlements. Since transport prices did not reflect the true cost of transferring goods from one location to another, however, and since the companies' budget constraints were not really binding, there was hardly any mechanism promoting the adjustment of localisation decisions to changes in the economic environment of the production units. Several studies undertaken during the 1980s revealed that the transport distances were generally too long to be efficient.<sup>20</sup>

Since the liberalisation of prices, however, transport prices reflect the real costs of transferring goods between provinces better than before. Today, as companies are usually governed

<sup>18</sup> Statistisches Bundesamt 1995, 174.

<sup>19</sup> Cf. Stadelbauer 1996, 113-115.

<sup>20</sup> Cf. Stadelbauer 1996, 9f.

by private ownership, these prices are taken increasingly into account in the strategies of companies. In addition, increasing inefficiencies in the operation of transport systems lead to an increase in transport costs. It became obvious that the radial structure of transport routes did not suit the increasingly decentralised economic ties in the Post-Soviet era. All these factors contributed to an increase in transport costs and may have shaped the localisation decisions of Russian companies.<sup>21</sup>

Free trade was also hampered by political developments. In the course of economic reforms a lot of competences in economic politics were transferred from the federal to the provincial level of administration. Many regions bargained for special rights with the federal government. The so-called federation-treaties granted them autonomous jurisdiction over specific export quotas and licenses. Such local trade barriers remained in force even after the introduction of the new constitution in 1993, prohibiting any autonomously introduced barriers to the free flows of goods, services and financial resources at the sub-national level (art. 74).<sup>22</sup>

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<sup>21</sup> Cf. Stadelbauer 1996, 443-447. Statistisches Bundesamt 1996, 187; Sutherland, Hanson 1996, 378; Matsnev 1996, 47f. Füllsack (2000) describes the disastrous consequences the growth of transport costs had for the northern regions, where nearly all food and consumer goods need to be delivered to the industrial locations from far abroad.

<sup>22</sup> Cf. OECD 1995, 49-51; Banzhaf 2002, 11-14.

### 3. Theoretical Considerations

In sum, the regional pattern of the Russian economy, which had been imposed in the Soviet era, was shaped by substantial changes in the economic environment during the 1990s. Large industrial agglomerations and highly specialised regional economies came under the pressure of liberalised prices, intensified competition and increased transport costs. This chapter deals with theoretical considerations about the consequences these developments may have had regarding regional income and cost of living differentials.

#### 3.1 The Neo-classical World

When economists deal with regional issues they mostly begin with Neo-classical Trade Theory, assuming that transport costs were completely negligible. If no transport costs arose in Russia's regional economic system, if there were only two provinces, if only two homogeneous goods were produced on the basis of different technologies and if labour was the only factor of production, then the Ricardian Model of International Trade would be appropriate to determine the spatial organisation of industry in Russia. Furthermore, constant returns of scale and perfect competition would have to be assumed. Under these circumstances, each province specialises in the production of that particular good for which it has a comparative advantage according to its technological endowment. Each province trades its good for another. Due to arbitrage, prices for the traded goods paid in each region equal the international price level. The endowment with technology is the only source of differences in real incomes throughout the provinces. The distance of a province from the location in which a good is produced is meaningless for provincial real income levels, as goods can be transported for free.

The Heckscher-Ohlin-Samuelson Model assumes that the provinces do not differ in their stock of technology but in their endowment with production factors. In contrast to the Ricardian Model, two factors of production are assumed. The Heckscher-Ohlin-Samuelson Model therefore allows for an analysis of the effect of free trade on the relative factor prices in a region. Due to free trade, each region specialises on the production of that particular good for which it has a comparative advantage stemming from its endowment with production factors. As a result, the demand for the relatively affluent factor of production rises, the one for the scarce factor diminishes. This leads to an equalisation of factor prices which is commonly referred to as the Factor Price Equalisation Theorem. The real income levels are solely determined by the endowment with production factors. Since transport costs are still zero, distances do not matter.<sup>23</sup>

#### 3.2 The Effects of Transport Costs

In the real world, however, no good can be traded without costs. Samuelson (1954) explains what is to be expected when positive transport costs are introduced into the Ricardian Model. These costs are modelled by a value decrease of goods during their transportation – as if

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<sup>23</sup> Cf. Mikic 1998, 3-130.

they were ice that melts on its way from one point to another. The major axiom of Samuelson's so-called Shrinkage in Transit Model is that "goods are relatively cheapest in their place of origin".<sup>24</sup> A good is not traded at all when the gains from exploiting the better productivity at a location are set off by the costs of swapping this good and its exchange good between the trading provinces.

Samuelson's considerations imply that distances do have an effect on regional price and income differentials. Provinces which are located far away from production settlements are more affected by higher prices and accordingly lower real incomes than provinces in the direct neighbourhood of production. But where is production typically located within a regional system?

### 3.3 The Effects of Regionally Restricted Externalities

The Ricardian Model assigns to the externally determined stock of technology a crucial role for the regional income distribution (see above). New Growth Theories, developed by Romer (1986; 1990), Lucas (1988) and by Rebelo (1991), treat technology as an endogenous variable. In their models the stock of technological knowledge within an economy not only determines the amount of investment within an economy but is also enlarged by each additional investment made by any individual company. Investment in knowledge exerts an external effect on other firms. As a result, the aggregated stock of technology and the output of the economy exhibit increasing marginal productivity, although from the perspective of an individual company investment in knowledge leads to diminishing returns of scale.<sup>25</sup>

Grossman and Helpman (1992; 1994) set the self-reinforcing circularity of technology formation and capital accumulation (technological spillovers) into the geographical context by connecting the major implications of New Growth Theories with traditional Theory of International Trade. According to Sternberg,<sup>26</sup> their approach was later enriched by Theories of Regional Economy and of Economic Geography,<sup>27</sup> forming a new school which he calls the New Regional Growth Theory.<sup>28</sup> In all of these models the geographical reach of the technological spillovers is a crucial variable. As long as these spillovers remain limited to a particular province they are likely to be a source of stable divergence of income levels. In contrast, when all companies within a regional system benefit from one company's investment in knowledge to the same extent, they are not.

Krugman (1997; 1991) established an alternative school dealing with the mechanisms of economic activity in space. The New Economic Geography<sup>29</sup> considers technological spillovers as one, but not the only source of self-reinforcing economic growth restricted to a par-

<sup>24</sup> Ibid., 269.

<sup>25</sup> Cf. Romer 1986; Barro, Sala-i-Martin 1998, 1014f.

<sup>26</sup> Sternberg 2001, 160-162.

<sup>27</sup> Bröcker 1994; Gahlen, Hesse, Ramser 1995.

<sup>28</sup> A comprehensive collection of writings connected to this approach can be found in Johansson, Karlsson and Stough (2000).

<sup>29</sup> Krugman's basic model, which will be described in the following paragraphs, has been modified by a number of authors (see for example Pflüger 2001; Helpman 1998). Schmutzler (1999, 364-371) gives a comprehensive overview on their contributions. Due to its formalised mathematical framework, it has been used as the basis for a number of empirical studies since the end of the 1990s. Some of them are summarised by Overmann, Redding and Venables (2001), others were presented at a conference at the German Institute for Economic Research in April 2002 (cf. DIW 2002). Fujita, Krugman and Venables (1999) have extended the model to the three regions case.



ticular region. While Grossman and Helpman developed their theory in response to a discontent about the compatibility of Growth Theories with regional issues,<sup>30</sup> Krugman's starting point has been the criticism of traditional Theories of International Trade:

" (...) the analysis of international trade makes virtually no use of insights from Economic Geography or location theory. We normally model countries as dimensionless points within which factors of production can be instantly and costlessly moved from one activity to another, and even trade among countries is usually given a sort of spaceless representation in which transport costs are zero for all goods that can be traded."<sup>31</sup>

In Krugman's model space is considered by assuming two possible locations of production. Transport costs occur when manufactured goods are transferred between them. The labour force consists of mobile manufacturing workers and immobile farmers. The production function of the manufacturing companies is characterised by increasing returns and fixed set up costs. Demand is proportional to the number of workers and farmers living in a particular location.<sup>32</sup> Under these circumstances three equilibria are possible: either all manufacturing companies and workers are located in location 1, or all in location 2, or half of the companies and workers are located in each of both locations. All three equilibria are stable: Once the companies have settled in one location, workers will move there. A high number of workers, in turn, raises demand and makes this region even more attractive for companies.<sup>33</sup>

On the one hand, Krugman identifies some externalities occurring in an agglomeration which make the concentration of companies and workers at a single location profitable and, therefore, serve as arguments in favour of the development of a centre. These are technological spillovers, labour market pooling and networks of suppliers of intermediate inputs. Transport costs, on the other hand, constitute an important force pushing companies and workers to the periphery: When transport costs exceed a certain limit, companies produce where the market is and spread their plants evenly over the region. Also, when transport costs approach zero, the factor costs become the more decisive argument in the location decisions and make companies resettle to the peripheral regions. In all other cases companies seek locations at the centre.

Krugman identifies a "price index effect" as being an important force 'pulling' workers and companies to the agglomeration: As transport costs make manufactured goods more expensive in the periphery than in the centre, the cost of living is expected to be higher in the periphery.<sup>34</sup> But what can be said about the prices of agricultural goods? In Krugman's model agricultural goods are available in both regions in the same quantities and can be transferred across the country without costs.<sup>35</sup> However, if transport costs for agricultural products were considered in the model, this would induce a price index effect pulling in the opposite direction: Agricultural products would be more expensive in the centre and, accordingly, the cost of living would be higher there.

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<sup>30</sup> "Growth theory traditionally has treated each country as if it were an island unto itself. Extensions of the theory to a world with international trade and capital flows have been left esoteric exercises for algebra lovers." (Grossman and Helpman 1994, 38)

<sup>31</sup> Krugman 1997, 2.

<sup>32</sup> Ibid., 14-16.

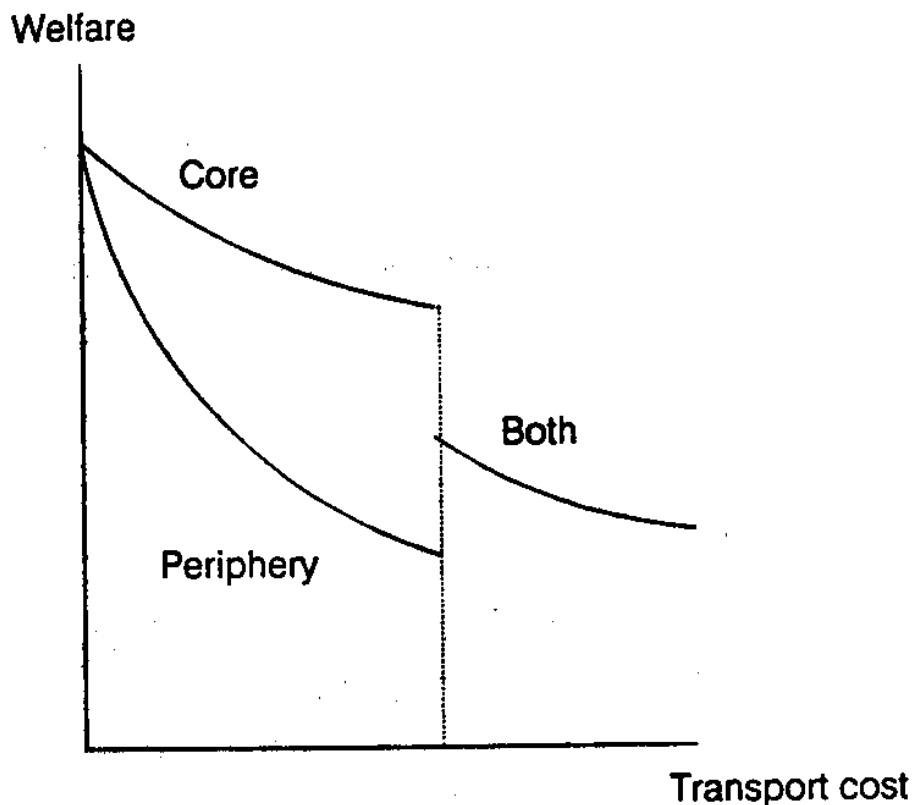
<sup>33</sup> Ibid., 16-23.

<sup>34</sup> Krugman 1991, 488f.

<sup>35</sup> Krugman (1991, 488f.) admits that this is a very "strong assumption". The reason why he made it was to ensure that the prices of agricultural goods are the same in both regions so that they can be treated as numeraires.

Krugman<sup>36</sup> also deals with the impact of transport costs on regional welfare levels in the framework of his model. As long as transport costs are so high that a centre has not developed, a decrease in transport costs will raise welfare in both regions to the same extent. But when transport costs fall short of a certain limit, the regional system becomes divided into a centre and a periphery and welfare becomes highest at the centre. The closer transport costs approach zero, however, the narrower the regional income gap gets. This is shown in figure 3.

**Figure 3: Interrelationship between regional welfare levels and transport costs in the Krugman Model.**



Source: Krugman 1997, 89.

### 3.4 The Effects of Centrality and of Governance

So far important driving forces of the development of regional income disparities have been identified. The New Economic Geography argues that not only the initial endowment with technology and immobile production factors, but also access to the market, regionally restricted external effects, transport costs and history play a major role in determining the average real incomes in provinces. Another interesting approach well known among Economic Geographers focuses on the location of the provinces relative to each other in order to explain the development of agglomerations: the Theory of the Central Places.

<sup>36</sup> Krugman 1997, 87-90.

According to Christaller (1933), companies offering goods or services typically choose locations at the geographical centre of a region in order to minimise the distance to their customers. These locations are typically at the same place for all suppliers of different services, so that companies tend to cluster around central places. Not all services can be found in all central places. Lower-level services, which are typically required every day, are present in almost all central places, whereas higher-level services, like embassies, concert halls or airports, are offered in only a few of them. The degree of "centrality" of a location is defined by the highest level of goods and services that can be obtained there. As a result of these regularities, the geographical space is made up of a hexagonally structured web of central places of different degrees.<sup>37</sup>

For the purpose of testing his theory in the Germany of the 1930s, Christaller used the so called "telephone method" to measure the centrality of a region. If a large share of the population was equipped with a telephone connection, this region was identified as being central. In the 1930s, telephone connections were scarce in Germany and they were restricted to a narrow group of people offering central services or goods.<sup>38</sup>

Another approach of Economic Geography focuses on governance functions. According to Ritter,<sup>39</sup> in all economic regional systems containing more than two settlements there is always at least one settlement within better reach for the average population compared to the others. Establishments and institutions which are important for all members of the regional system will typically be located there. These locations are defined as governance centres. All other locations, sub-regions and single economies take set decisions, guidelines or impulses for action from these centres. Governance centres also exert a certain degree of control over the development of the sub-systems.

Governance centres typically attract headquarters of state institutions, of enterprises and of other organisations. The high incomes people receive in these establishments lead to a comparatively high purchasing power in the area of the centre, attracting suppliers of high-level goods and services. Due to their access to markets and due to advantages arising from the contact with other companies, governance centres sustain themselves. The availability of information as well as "the urban dynamic with all its multiplicative effects"<sup>40</sup> are supposed to be other important factors keeping the governance centre at work and sustaining the exceptionally high real income levels in these locations. Thus, markets and regionally restricted external effects play a rule not only in the New Economic Geography but also in more traditional geographic approaches.

### 3.5 Trade Theories in the Context of Post-Soviet Russia

A surprising similarity of the theoretically derived pattern of economic activity and the real economy of Soviet Russia can be recognised: As in the Ricardian Model of International Trade and the Heckscher-Ohlin-Samuelson Model – in which transport costs are zero – the Russian provinces were highly specialised in particular products; as in the low-transport-costs-scenario of the New Economic Geography, industrial settlements were primarily located within large agglomerations. However, the preconditions in the Soviet Union were

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<sup>37</sup> Cf. Christaller 1933, 63-85; Lang 2001, 35-42; Ritter 1998, 194-225.

<sup>38</sup> Cf. Christaller 1933.

<sup>39</sup> Ritter 1998, 179.

<sup>40</sup> Ibid., 181.

completely different from those assumed in the theoretical models. Market competition between companies was prohibited instead of being perfect – or at least monopolistic. Prices were set by the administration instead of being determined by the market. Thus, the coincidence of the real and the theoretical pattern seems to indicate the Soviet planning authorities' knowledge of economic theories than to prove the validity of these theories in the context of Soviet Russia. It can be argued that, with the introduction of market reforms, the circumstances in Russia came closer to the assumptions made in the theoretical models above. The companies' budget constraints became 'harder', the prices liberalised and the transport prices became more 'realistic'. What impact did these changes have on the Russian economy?

For the early 1990s Dmitrieva and Matsnev report an exceptionally rapid decline in production in mechanical engineering, metal-processing, light and food industries.<sup>41</sup> By contrast, in the resource extracting industries and metallurgy, which have been better able to compete at world-market prices, the contraction was comparatively small. This structural change led to changes in the regional distribution of economic growth, reflecting the diverse economic specialisations of the provinces. Before 1992 the highest growth had occurred in the European part of Russia, particularly in the North-West, the Central and the Central-Black-Earth region. After 1992, in contrast, the provinces in the North and in Eastern Siberia appeared to be the fastest growing economies in Russia.

The purpose of the study at hand is to investigate how regional cost of living and income differentials developed in the aftermath of this sectoral and regional restructuring. Before analysing empirical data on that issue it is important to determine the appropriate method of measuring the cost of living differences between provinces.

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<sup>41</sup> Dmitrieva 1994, 105-112; Matsnev 1996, 44-49.

## 4. Methods of Measuring Cost of Living Differentials

Regional cost of living relatives can be most clearly expressed by means of a multilateral index. From the perspective of mathematical practicability this index should be circular. According to Gini,<sup>42</sup> an index is circular when it is both reversible and transitive. Reversibility means that the index of region  $a$  using region  $b$  as base is the reciprocal of the index of region  $b$  using region  $a$  as base. Transitivity means that an index of region  $a$  using region  $b$  as base can be derived from the ratio of the indices of both regions using a third region  $c$  as base. Therefore, for circular index numbers the following equation should hold:

$$(1) P^{a,b} = \frac{1}{P^{a,c} \cdot P^{c,b}},$$

where  $P^{a,b}$  is the cost of living index of region  $a$  using region  $b$  as base.

From the economic perspective, a price index should conform with micro-economic consumers theory. In this regard Konüs<sup>43</sup> states that the true index of the cost of living should indicate the differences in the costs based on which an identical standard of living can be achieved when the prices are different:

$$(2) P_K^{a,b} = \frac{e(\mathbf{p}^a, u)}{e(\mathbf{p}^b, u)},$$

where  $e$  is the amount of minimum expenditures, necessary to achieve the utility level  $u$  at commodity prices  $p_1^a, \dots, p_n^a$  in region  $a$ . The variables  $p_1^a, \dots, p_n^a$  constitute the price vector  $\mathbf{p}^a$ .

### 4.1 The 'Goskomstat Index'

The Russian Federal Office for Statistics, Goskomstat (2002), recommends two measures for the comparison of the cost of living between provinces:

The "cost of a fixed bundle of consumer goods and services" is calculated on the basis of uniform quantities of consumer goods and services, and on the average prices for these goods in the provinces. The basket at the basis of the calculation of this index contains 30 nutritional goods, 41 non-nutritional goods and 12 kinds of services.

The "cost of the minimum bundle of nutritional goods" is calculated on the basis of the quantities of various kinds of food necessary for the subsistence of an average Rus-

<sup>42</sup> Gini 1931, 3f.

<sup>43</sup> Konüs 1939, 10.

sian man of working-age. The consumption bundle is fixed for the whole Russian territory.

Therefore, an inter-regional index of cost of living can be obtained by indexing the cost of one of these bundles to a particular province or to the Russian average. This is a special case of the "symmetric mean average quantity method", which leads to circular index numbers, as Diewert shows.<sup>44</sup> However, it is questionable whether such an index can be justified by micro-economic theory.

The Goskomstat index numbers are Laspeyres indices of each region  $a$  using as base a hypothetical province  $c$  in which the average Russian households live:

$$(3) P_L^{a,c} = \frac{e(p^a, q^c)}{e(p^c, q^c)} = \frac{\sum_i p_i^a q_i^c}{\sum_i p_i^c q_i^c},$$

where  $q_i^c$  is the quantity of consumption of good  $i$  in region  $c$ .<sup>45</sup>

Therefore, the Laspeyres index does not take into account the fact that the proportion of goods in the consumption bundle may differ from province to province due to the substitution effect and due to different preference orderings among the consumers. It measures the cost of a fixed consumption bundle in different regions, not the cost of a fixed standard of living as the Konüs index does. Assuming that the utility functions were the same in two provinces the Laspeyres index calculated for these regions over-estimates the differences in the cost of living as long as the relative commodity prices in both provinces are different and the households therefore substitute one good for another.<sup>46</sup>

The theoretical dilemma is that neither the quantities consumed in the base region nor those consumed in the numerator region can be assumed to be the appropriate weights for calculating the average price-ratio. In this context, Fisher points to the principle of fairness, meaning that both regions should be considered equally in the calculation of the price index.<sup>47</sup> He recommends estimating the index of the cost of living using the geometric average of both the Laspeyres index, which uses the quantities in the base region as weights, and the Paasche (1871) index, which uses the quantities in the numerator region as weights:

$$(4) P_F^{a,b} = \left( \frac{\sum_{i=1}^N p_i^a q_i^b}{\sum_{i=1}^N p_i^b q_i^b} \cdot \frac{\sum_{i=1}^N p_i^a q_i^a}{\sum_{i=1}^N p_i^b q_i^a} \right)^{1/2}$$

<sup>44</sup> Diewert 1996, 13f.

<sup>45</sup> Cf. Laspeyres 1874.

<sup>46</sup> Cf. Diewert 1988, 770f.

<sup>47</sup> Fisher 1927, 10.

## 4.2 The Gini Eltetö Köves Szulc Index

The set of multilateral index numbers, which both fulfil the circularity criterion and minimise the sum of log deviations from the bilateral Fisher indices is the set of Gini Eltetö Köves Szulc (GEKS) indices. The GEKS indices are calculated as follows:<sup>48</sup>

$$(5) P_{GEKS}^{a,b} = \prod_{c=1}^M \left[ \frac{P_F^{a,c}}{P_F^{b,c}} \right]^{1/M}$$

The appeal of the GEKS index is attributed to its properties of being circular on the one hand and to being based as closely as possible on the quantities actually consumed in the pairs of compared regions on the other hand. In contrast, the cost of living indices provided by Goskomstat assume that the relative quantities of consumption are the same in all Russian regions, irrespective of different price relations and utility functions. However, due to the great distances in Russia and due to the high degree of specialisation, relative prices can be assumed to differ considerably throughout the country. Since the consumers in Russia belong to a large number of different ethnic groups, it seems also likely that preferences should not be identical in each province. A GEKS index of the cost of living in Russian provinces based on nutritional products will be derived in the following chapter.

<sup>48</sup> Gini 1939; Eltetö, Köves 1964; Szulc 1964. The GEKS index is also used by Eurostat and the OECD for international real income comparisons. The method has been discussed comprehensively at the Joint World Bank - OECD Seminar on Purchasing Power Parities (OECD 2001). Further details about the application by Eurostat can be found in Krug (1995). Diewert (1996, 20-38), Cuthbert and Cuthbert (1988) and Diehl (1978) compare the GEKS method with other approaches of international price comparison.

## 5. The Cost of Living in Russian Provinces

The Russia Longitudinal Monitoring Survey (RLMS) provides the information necessary to calculate the cost of food consumption in 32 Russian provinces. In round 9, 4006 households were asked to report their expenditures for 57 sorts of nutritional products in the past week and the quantity of consumption with respect to these goods.

Using formula (4) and formula (5), the GEKS index can be calculated from the aggregated quantities and prices on the provincial level:

$$(6) P_{GEKS}^{a,b} = \prod_{c=1}^M \left[ \frac{\left( \frac{\sum_{i=1}^N p_i^a q_i^c}{\sum_{i=1}^N p_i^c q_i^c} \cdot \frac{\sum_{i=1}^N p_i^a q_i^a}{\sum_{i=1}^N p_i^c q_i^a} \right)^{1/2}}{\left( \frac{\sum_{i=1}^N p_i^b q_i^c}{\sum_{i=1}^N p_i^c q_i^c} \cdot \frac{\sum_{i=1}^N p_i^b q_i^b}{\sum_{i=1}^N p_i^b q_i^a} \right)^{1/2}} \right]^{1/M}$$

The calculation of the price level  $p$  in province  $a$ ,  $b$  or  $c$  for a nutritional product of category  $i$  is based on the information of all surveyed households within the particular province, the representatives of which stated that the product had been bought in the past seven days. The stated expenditure values were aggregated over the whole province and divided by the aggregated quantities of consumption ( $q$ ). The data was weighted using the RLMS household weights. If less than 25 statements for a particular food category were available in a province, the resulting price level was judged as not being representative and this food category was excluded from the calculation of the cost of living index of the pair of provinces. Also, the first and the last percentile of the All-Russian price distribution were left out. Taking into account that the timing of interviews varied over a four months period, the stated rouble amounts for expenditures were deflated by the monthly inflation rates provided by Goskomstat.<sup>49</sup>

### 5.1 Geographical Dispersion

Table 1 and figure A-4 in the appendix show the geographical distribution of the GEKS food price index in the year 2000 for all 32 provinces participating in the RLMS. Moscow was chosen arbitrarily as the base region. By comparison, the cost of a subsistence nutrition basket, calculated by Goskomstat for the year 2000, is indexed with respect to Moscow and listed in column 5 of table 1. The table reveals large variations in the cost of nutrition. People in Stavropol need to spend about a third less than people in Moscow for the food consumption as-

<sup>49</sup> Goskomstat: Tseny v Rossii; Goskomstat: Regiony Rossii. Since monthly inflation rates were not available at the province level, they were estimated by multiplying the monthly all-Russian inflation rate with the ratio of the yearly provincial and the yearly all-Russian inflation rate.



sociated with the same standard of living. In Khanty-Mansiisk, in contrast, food consumption is about a tenth more expensive than in the capital.

**Table 1: Cost of living indices for 1995 and 2000.**

| Region<br>(Fed. Okrug) | Province (Subekt)            | RLMS:<br>GEKS index<br>(1995) | GEKS index<br>(2000) | Goskomstat:<br>Cost of subsis-<br>tence index<br>(2000) |
|------------------------|------------------------------|-------------------------------|----------------------|---|
| Central                | Moskva                       | 1,0000                        | 1,0000               | 1,0000  |
|                        | Kaluzhskaya Oblast'          | 0,7820                        | 0,7551               | 0,7532  |
|                        | Lipetskaya Oblast'           | 0,8103                        | 0,7930               | 0,7034  |
|                        | Moskovskaya Oblast'          | 0,9392                        | 0,9641               | 0,8006  |
|                        | Smolenskaya Oblast'          | 0,7960                        | 0,8415               | 0,7489  |
|                        | Tambovskaya Oblast'          | 0,7046                        | 0,7476               | 0,6771  |
|                        | Tul'skaja Oblast'            | 0,8730                        | 0,8205               | 0,7708  |
| North-West             | Sankt Peterburg              | 0,9126                        | 0,9544               | 0,8702  |
|                        | Respublika Komi              | 1,0621                        | 0,9288               | 0,8112  |
|                        | Tverskaya Oblast' (Kalinin)  | 0,7884                        | 0,7980               | 0,8093  |
|                        | Leningradskaya Oblast'       | 0,8320                        | 0,8413               | 0,8008  |
| South                  | Kabardino-Balkarskaya Resp.  | 0,7255                        | 0,8556               | 0,7020  |
|                        | Krasnodarskii Krai           | 0,7633                        | 0,7542               | 0,6975  |
|                        | Stavropolskii Krai           | 0,6848                        | 0,6885               | 0,7184  |
|                        | Volgogradskaya Oblast'       | 0,7630                        | 0,7941               | 0,7523  |
|                        | Rostovskaya Oblast'          | 0,7880                        | 0,7594               | 0,6744  |
| Volga                  | Respublika Tatarstan         | 0,8440                        | 0,7767               | 0,6817  |
|                        | Udmurtskaya Respublika       | 0,7931                        | 0,7819               | 0,7684  |
|                        | Chuvashskaya Respublika      | 0,7756                        | 0,7323               | 0,7103  |
|                        | Nizhegorodskaya Oblast'      | 0,8591                        | 0,8467               | 0,7401  |
|                        | Orenburgskaya Oblast'        | 0,8260                        | 0,7899               | 0,7595  |
|                        | Penzenskaya Oblast'          | 0,9593                        | 0,7167               | 0,7081  |
|                        | Permskaya Oblast'            | 1,0969                        | 0,8372               | 0,7822  |
|                        | Saratovskaya Oblast'         | 0,7992                        | 0,7743               | 0,7851  |
| Ural                   | Kurganskaya Oblast'          | 0,8333                        | 0,8108               | 0,7343  |
|                        | Khanty-Mansiiskii Avt. Okrug | 1,2768                        | 1,1056               | 1,1125  |
|                        | Cheliabinskaya Oblast'       | 0,8830                        | 0,7880               | 0,8195  |
| Siberia                | Altayskii Krai               | 0,8239                        | 0,7444               | 0,8084  |
|                        | Krasnoyarskii Krai           | 0,9994                        | 0,8430               | 0,8841  |
|                        | Tomskaya Oblast'             | 1,0102                        | 0,8653               | 0,7437  |
| Far East               | Primorskii Kraj              | 1,1450                        | 1,0698               | 1,0077  |
|                        | Amurskaya Oblast'            | 0,8613                        | 0,7700               | 0,8267  |
| Standard Deviation     |                              | 0,1344                        | 0,0984               | 0,0996  |

Sources: Goskomstat, "Regiony Rossii"; own calculations based on RLMS data.

As could be expected from the conclusions drawn in chapter 4.1., the GEKS index indicates slightly smaller variations in food prices than the Goskomstat index. The standard deviation of the GEKS index is 0,0984 compared to 0,0996 of the Goskomstat index. As consumers substitute the relatively expensive products in their province for cheaper ones, they outweigh the price differences to a certain extent. The Goskomstat measure is unable to take this sub-

stitution effect into account. A correlation analysis for both index numbers reveals a correlation coefficient of 0,8195.

## 5.2 Influential Factors

Given the theoretical considerations of the Shrinkage in Transit Model, nutritional products should be cheapest in the province in which they are produced. Consequently, average food prices are expected to be higher in the agriculturally less suited provinces in the north and east compared to the agriculturally better suited regions in the south and west. This has been tested by a simple regression the results of which are presented in table 2.

**Table 2: Regression results: price index for food by agricultural area and city location**

|                                 | const. |         | beta    |         | R <sup>2</sup> | corr. coeff. |
|---------------------------------|--------|---------|---------|---------|----------------|--------------|
| Agricultural area <30% vs. ≥30% | 0,8610 | (33,72) | -0,0686 | (-2,08) | 0,1340         | -0,3660      |
| Agricultural area <60% vs. ≥60% | 0,8482 | (42,56) | -0,0773 | (-2,35) | 0,1647         | -0,4058      |
| Moscow and St. Petersburg       | 0,8198 | (48,80) | 0,1574  | (2,34)  | 0,1546         | 0,3931       |

The values of the t statistics indicate a significant interdependence between the local conditions for agriculture and the prices for food at a five percent level. In provinces in which only 30 percent of the area are suited for agriculture – Moscow and St. Petersburg excluded – the price level for food is at 86 percent of prices in Moscow. In regions with a higher proportion of agriculturally suited land, the prices for food are lower by seven percentage points (column 1). In those regions where the agricultural area exceeds 60 percent the price level is eight percentage points lower than elsewhere (column 2). Another regression analysis reveals that in the cities Moscow and St. Petersburg prices are by about a fifth higher than in the other observed provinces (column 3).

## 5.3 Trend Over Time

Column 3 of table 1 shows how large the cost of living differences had been five years earlier. In most of the provinces in which food was comparatively expensive in 2000 it had been expensive already in 1995. The GEKS indices at both points of time are correlated with each other by a correlation coefficient of 0,7811. However, regional differences have diminished. The standard deviation decreased by 3,6 percentage points. This finding indicates that the process of disintegration and increasing inefficiencies of the transport systems has come to an end and that in the second half of the 1990s transport costs have declined. To say it with Samuelson's words: goods "shrink in transit" to a lesser extent than before.

## 6. Real Household Equivalent Incomes in Russian Provinces

The cost of living index discussed in the previous chapter will now be used to transform nominal household incomes into their 'real' value. Nominal income levels were calculated on the basis of information collected from 3372 households participating in the RLMS on the amount of their monthly income from different sources.<sup>50</sup> The stated rouble amounts were deflated by the monthly inflation rates. For the calculation of the household equivalent income the household members were weighted according to the key laid down in the German Law for Social Welfare.<sup>51</sup>

### 6.1 Geographical Dispersion

Table 3 and figure A-5 in the appendix present the average household equivalent incomes in the 32 Russian provinces within the sample as well as their 'real' value, measured in terms of the purchasing power of a rouble spent in Moscow. An average household living in Amur earns 580 roubles per month. From this income it could satisfy the same needs in terms of food consumption as a household in Moscow earning 753 roubles. The average household income in Khanty-Mansiisk is by six times higher than in Amur. Due to the high cost of food consumption, this income is equivalent to only 3290 roubles spent in Moscow, instead of 3637 roubles spent in Khanty-Mansiisk.

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<sup>50</sup> The measure of the household income at the basis of the analysis includes wages after taxes, income from capital investments or from selling or renting property, pensions, stipends or unemployment benefits, insurance payments, alimonies, repayments of loans, subsidies and benefits for apartment renting, spending of savings or from selling jewellery, hard currency or securities, gratuitous money from private persons or organisations, child benefits and subsidies from the government. Wages paid in the form of goods or services are also included. In this case the household representative was asked to estimate the amount in roubles.

<sup>51</sup> Cf. Bäcker, Hanesch, Krause 1998.

Table 3: Nominal and real household equivalent incomes 2000

| Region<br>(Fed. Okrug)                   | Province (Subekt)            | Nominal income<br>(in Roubles) | Real income<br>(in PPP of Moscow Roubles) | Number of observations |
|--|------------------------------|--------------------------------|---|------------------------|
| Central                                  | Moskva                       | 2078                           | 2078                                      | 85                     |
|  | Kaluzhskaya Oblast'          | 813                            | 1076                                      | 79                     |
|  | Lipetskaya Oblast'           | 1384                           | 1745                                      | 85                     |
|  | Moskovskaya Oblast'          | 2536                           | 2630                                      | 129                    |
|  | Smolenskaya Oblast'          | 1774                           | 2108                                      | 70                     |
|  | Tambovskaya Oblast'          | 1420                           | 1899                                      | 68                     |
|  | Tul'skaja Oblast'            | 1608                           | 1959                                      | 74                     |
| North-West                               | Sankt Peterburg              | 3393                           | 3555                                      | 50                     |
|  | Respublika Komi              | 2353                           | 2533                                      | 126                    |
|  | Tverskaya Oblast' (Kalinin)  | 1269                           | 1590                                      | 71                     |
|  | Leningradskaya Oblast'       | 1200                           | 1426                                      | 64                     |
| South                                    | Kabardino-Balkarskaya Resp.  | 1187                           | 1387                                      | 68                     |
|  | Krasnodarskii Krai           | 1827                           | 2422                                      | 158                    |
|  | Stavropolskii Krai           | 844                            | 1226                                      | 67                     |
|  | Volgogradskaya Oblast'       | 849                            | 1069                                      | 85                     |
|  | Rostovskaya Oblast'          | 1483                           | 1953                                      | 62                     |
| Volga                                    | Respublika Tatarstan         | 1194                           | 1538                                      | 70                     |
|  | Udmurtskaya Respublika       | 2024                           | 2589                                      | 69                     |
|  | Chuvashskaya Respublika      | 940                            | 1284                                      | 92                     |
|  | Nizhegorodskaya Oblast'      | 2944                           | 3478                                      | 62                     |
|  | Orenburgskaya Oblast'        | 1211                           | 1533                                      | 60                     |
|  | Penzenskaya Oblast'          | 591                            | 824                                       | 73                     |
|  | Permskaya Oblast'            | 1889                           | 2256                                      | 74                     |
|  | Saratovskaya Oblast'         | 1695                           | 2189                                      | 154                    |
| Ural                                     | Kurganskaya Oblast'          | 1036                           | 1278                                      | 61                     |
|  | Khanty-Mansiiskii Avt. Okrug | 3637                           | 3290                                      | 68                     |
|  | Cheliabinskaya Oblast'       | 1291                           | 1638                                      | 136                    |
| Siberia                                  | Altaiskii Krai               | 782                            | 1050                                      | 174                    |
|  | Krasnoyarskii Krai           | 1559                           | 1849                                      | 138                    |
|  | Tomskaya Oblast'             | 1517                           | 1754                                      | 79                     |
| Far East                                 | Primorskii Kraj              | 1811                           | 1693                                      | 63                     |
|  | Amurskaya Oblast'            | 580                            | 753                                       | 76                     |
| Gini Coefficient over all Households     |                              | 0,5251                         | 0,5098                                    | 3368                   |
| Relative Mean Deviation over all Regions |                              | 0,1768                         | 0,1482                                    | 32                     |

Source: own calculations based on RLMS data.

The RLMS data indicates a high inequality in nominal incomes throughout Russian households. The value of the Gini coefficient is 0,5251. However, the inequality diminishes if the regional variations in the cost of living are taken into account, since for the real household incomes the Gini is only 0,5098.

In order to check the consistency of these results with other studies, the results were compared with the purchasing power of wages in 1997, estimated by the All-Russian Centre for

Living Standard,<sup>52</sup> by deflating the nominal personal wage rate with the costs of the Goskomstat subsistence bundle of nutrition. The correlation coefficient between the provincial real wage levels in 1997 according to the All-Russian Centre and the real income levels in 2000 according to the RLMS is 0,4885.

## 6.2 Influential Factors

According to the New Economic Geography, differences in real income levels are primarily attributed to centre-periphery patterns. Companies have a high incentive to settle in the centres in order to benefit from high demand, supplier networks and labour market pooling. In Soviet Russia industrial agglomerations were planned with the explicit aim to induce spillover effects and to establish poles of self-reinforcing regional growth. Real incomes can be assumed to be comparatively high in such locations. In fact, a regression analysis reveals a statistical interrelationship between the location of TPCs, plotted in figure A-3, and the amount of average real incomes in provinces at the five percent significance level. The first row in table 4 indicates that in the provinces in which the Soviet administration had not established a TPC, the real household incomes are on average as high as 1566 purchasing power parities of a rouble purchased in Moscow. In the provinces with TPCs the average real household income is by more than a half higher.

**Table 4: Regression results: determinants of provincial real income levels 2000 (in purchasing power parity of a Moscow Rouble).**

| Independent Variable                    | const. |         | beta |        | R <sup>2</sup> | corr. coeff. |
|---|--------|---------|------|--------|----------------|--------------|
| Territorial Production Complex (yes/no) | 1566   | (12,16) | 867  | (3,94) | 0,3416         | 0,5844       |
| Telephone density 1995 (%)              | 1026   | (4,17)  | 17   | (2,67) | 0,1969         | 0,3901       |
| Hi-Technology Centre (yes/no)           | 1769   | (11,64) | 305  | (1,12) | 0,0402         | 0,2004       |

What results does Christaller's telephone method of measuring centrality elicit? The RLMS data surveyed in 1995 contain information about the number of telephone connections per inhabitant in the settlements of the participating households. This variable also appears to have a significant positive impact on provincial real income levels: every percentage point in telephone density alters the average household income by 17 roubles. In Moscow, the one governance centre of Russia, the average real income level (2078 roubles) exceeds the all-Russian average (1857 purchasing power parities of a rouble purchased in Moscow) by 12 percent.

In contrast, a statistical interrelation between the major high-technology centres of Soviet Russia, plotted in figure A-2, and the provincial real income levels cannot be demonstrated. Indeed, real incomes in the technological core regions were on average nearly a fifth higher than elsewhere. However, the deviations from the averages are so large that even at a 10 percent level a stochastic dependence cannot be confirmed. Different explanations may account for this finding. Perhaps the sort of knowledge which had been accumulated in the high-technology zones of the Soviet Union is not suited to induce meaningful effects on output growth in post-Soviet times. Maybe technological innovations spread rapidly across the whole Russian territory, so that technological spillovers are not regionally restricted.

<sup>52</sup> Men'shikova 1998.

### 6.3 Trend Over Time

Table 5 presents the calculated nominal and real household equivalence incomes for the year 1995. A relatively high real income level in 1995 is correlated by factor 0,6562 with a relatively high level in 2000. This means that the order of the income levels has remained more or less the same over the five year period.

**Table 5: Nominal and real household equivalent incomes 1995**

| Region (Fed. Okrug)                      | Province (Subekt)            | Nominal income (in Roubles) | Real income (in PPP of Moscow Roubles) | Number of observations |
|--|------------------------------|-----------------------------|--|------------------------|
| Central                                  | Moskva                       | 830935                      | 830935                                 | 154                    |
|  | Kaluzhskaya Oblast'          | 182957                      | 233946                                 | 88                     |
|  | Lipetskaya Oblast'           | 374865                      | 462628                                 | 70                     |
|  | Moskovskaya Oblast'          | 589503                      | 627641                                 | 131                    |
|  | Smolenskaya Oblast'          | 447009                      | 561545                                 | 78                     |
|  | Tambovskaya Oblast'          | 172517                      | 244828                                 | 63                     |
|  | Tul'skaja Oblast'            | 411200                      | 470997                                 | 73                     |
| North-West                               | Sankt Peterburg              | 586338                      | 642518                                 | 78                     |
|  | Respublika Komi              | 677928                      | 638309                                 | 150                    |
|  | Tverskaya Oblast' (Kalinin)  | 392290                      | 497596                                 | 86                     |
|  | Leningradskaya Oblast'       | 343448                      | 412799                                 | 77                     |
| South                                    | Kabardino-Balkarskaya Resp.  | 196611                      | 271006                                 | 65                     |
|  | Krasnodarskii Krai           | 411075                      | 538572                                 | 147                    |
|  | Stavropolskii Krai           | 349340                      | 510143                                 | 70                     |
|  | Volgogradskaya Oblast'       | 218812                      | 286760                                 | 86                     |
|  | Rostovskaya Oblast'          | 634888                      | 805646                                 | 65                     |
| Volga                                    | Respublika Tatarstan         | 353565                      | 418893                                 | 73                     |
|  | Udmurtskaya Respublika       | 344988                      | 434997                                 | 63                     |
|  | Chuvashskaya Respublika      | 240823                      | 310490                                 | 90                     |
|  | Nizhegorodskaya Oblast'      | 452714                      | 526980                                 | 73                     |
|  | Orenburgskaya Oblast'        | 325593                      | 394186                                 | 85                     |
|  | Penzenskaya Oblast'          | 134694                      | 140403                                 | 81                     |
|  | Permskaya Oblast'            | 430513                      | 392476                                 | 68                     |
|  | Saratovskaya Oblast'         | 368169                      | 460644                                 | 143                    |
| Ural                                     | Kurganskaya Oblast'          | 395522                      | 474649                                 | 75                     |
|  | Khanty-Mansiiskii Avt. Okrug | 1288110                     | 1008835                                | 74                     |
|  | Cheliabinskaya Oblast'       | 299771                      | 339490                                 | 147                    |
| Siberia                                  | Altayskii Krai               | 281753                      | 341969                                 | 160                    |
|  | Krasnoyarskii Krai           | 375016                      | 375243                                 | 149                    |
|  | Tomskaya Oblast'             | 527428                      | 522080                                 | 65                     |
| Far East                                 | Primorskii Krai              | 533904                      | 466299                                 | 67                     |
|  | Amurskaya Oblast'            | 293504                      | 340770                                 | 72                     |
| Gini Coefficient over all Households     |                              | 0,5378                      | 0,5210                                 | 2966                   |
| Relative Mean Deviation over all Regions |                              | 0,1760                      | 0,1402                                 | 32                     |

Source: own calculations based on RLMS data.

The relative deviations of the provincial real income levels from the mean, taken over all provinces, have on average increased slightly from 14,02 percent to 14,82 percent. Meanwhile, the relative mean deviation of nominal incomes has remained almost unchanged (0,1760 in 1995, 0,1768 in 2000). The decrease in price differences observed above seems to have had the effect that differences in real incomes have become larger while the differences in nominal incomes have remained nearly the same.

The observed divergence of provincial real income levels is compatible with the finding above that transport prices seem to have decreased in the second half of the 1990s (see above) and with the predictions of the New Economic Geography for this case. Production becomes increasingly regionally concentrated as the benefits companies achieve from external effects occurring in agglomerations become a more powerful argument in their location decisions than the costs of not being present in all parts of the territory. This leads to higher profits and higher wages in the centres relative to those in the periphery so that the gap of income levels widens.

Nutritional products – in contrast to manufactured ones – are more expensive in the centre than in the periphery. Therefore, the 'food price index effect' identified earlier – though not considered in Krugman's Model –, tends to smoothen regional real income disparities. When transport costs decrease this effect should become less powerful because, according to the Shrinkage in Transit Model, regional price levels for nutritional products should converge. As a consequence, when only food prices are considered in the calculation of real income levels, a decrease of transport costs and the associated equalisation of food prices are expected to intensify the divergence of real income levels. This can be observed in the presented numbers of income and cost of living levels in Russian provinces for 1995 and 2000. The growing divergence of real income levels seems to be mainly attributable to a decrease of food price differentials and, to a lesser extent, to an increase in nominal income differentials.

## 7. Conclusion

Eight years after the liberalisation of prices, significant differences in the cost of food consumption can be observed throughout Russia's provinces. The analysis of RLMS data reveals that households in the Penzenskaya Oblast' can purchase 50 percent more food with a rouble than households in Khanty-Mansiisk. Nutritional products are exceptionally expensive in provinces in which agriculturally useful land is scarce. However, regional price differences have decreased during the second half of the 1990s, indicating perhaps a fall of transport costs.

Average real household incomes, measured in terms of food equivalents, are highly shaped by the centre-periphery pattern inherited from the former Soviet Union. They are exceptionally high in provinces in which a territorial production complex had been established and in Moscow, the governance centre of Russia. Centrality can also be identified by the rate of telephone density. The study reveals that with each percentage point increase of telephone connections per inhabitants the real income increases on average by a money equivalent of 17 roubles spent in Moscow.

The average real incomes of the surveyed provinces vary from the mean on average by 14 percent. The relative mean deviation of provincial income levels would be even larger if the differences in the cost of nutrition were not taken into account. High nominal incomes most often correspond with a high cost of food consumption because industrial centres are predominantly located in provinces with few agriculturally usable land. The increase of regional real income differentials between 1995 and 2000 is mainly owed to the decrease of food prices differentials while nominal income differentials increased only slightly.

Thus, despite a substantial sectoral and geographical restructuring of the Russian economy during the 1990s, the regional pattern of real income disparities remained almost stable. In the year 2000, incomes were still highest in the industrial centres of Soviet Russia. The New Economic Geography explains such long-lasting stability of centre-periphery patterns with endogenous localisation advantages in the centres reinforcing themselves. These include access to large markets, technological spillovers, dense networks of intermediate-good suppliers and pooled labour markets. Increasing transport costs could lead to a dispersion of capital and labour. In Russia, however, although the economic reforms during the early 1990s lead to a sharp increase of actual transport costs, the traditional centres are still in place. For the second half of the 1990s, in contrast, this study indicates a decline of transport costs, perhaps due to a political re-integration and a higher efficiency of the transport systems. The finding of a divergence of real income levels during this period, therefore, conforms with the expectations of the New Economic Geography.

Food consumption is obviously one of the most basic human needs. Real incomes measured in terms of food equivalents are, therefore, an important indicator of welfare, as they express the inhabitants' possibilities of nutrition. However, a large part of the cost of living is made up by consumption of manufactured goods. According to Krugman's Model of New Economic Geography and according to Samuelson's Shrinkage in Transit Model, prices for manufactured goods should be more expensive in the periphery. Therefore, in the face of declining transport costs, the development of the prices for manufactured goods should have the opposite effect on regional real income differences as compared to the development of food



prices, analysed in the framework of this study: real income disparities measured in terms of manufactured good consumption possibilities should diminish. Unfortunately, the RLMS does not contain any data about the quantities of manufactured goods consumption. Thus, price levels for this type of goods can hardly be estimated.

It should also be noted that not all food is purchased. In Russia, many households consume fruits and vegetables harvested in the own garden. Although this component of household income cannot be neglected, its amount is hardly measured by any empirical study. The RLMS contains detailed data about the quantity of self-harvested nutritional products. These could be valued using the provincial food prices calculated in chapter 4. Thus, a lot of research can still be done to investigate the cost of living and real income differentials in Russia. This study reveals that both variables vary considerably throughout the country and that the cost of living are worth being considered in regional income comparisons.

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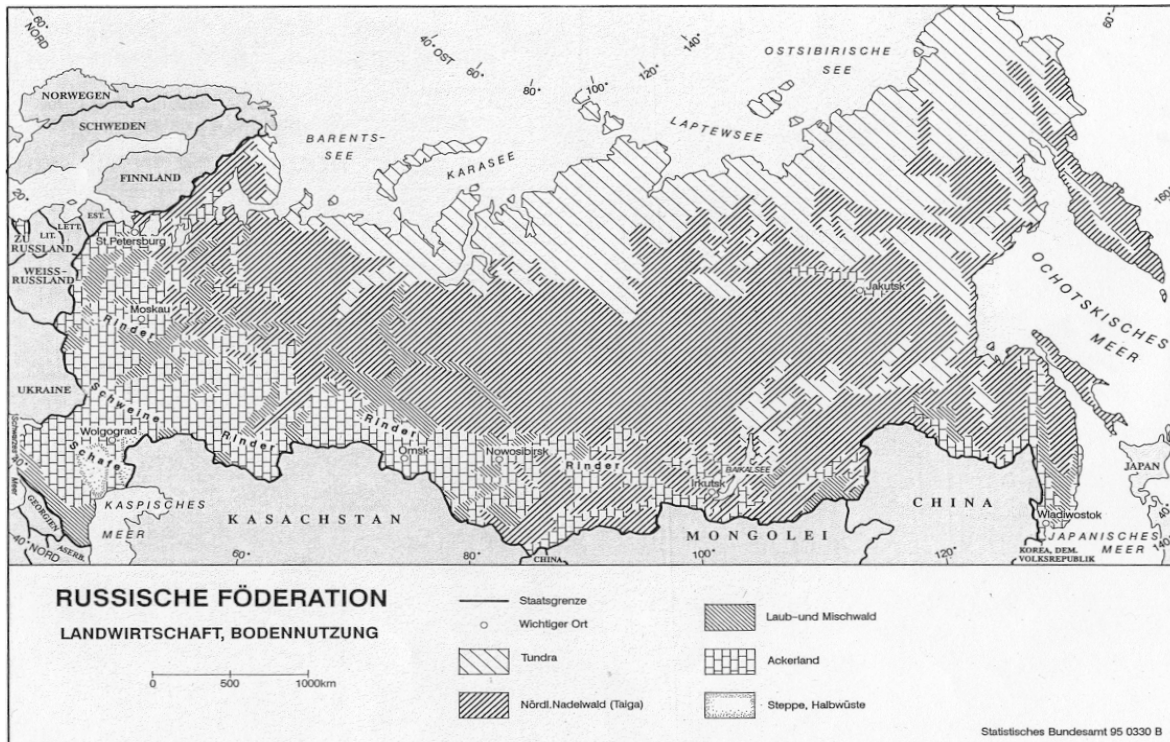
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# Appendix

Figure A-1: Agriculturally used land in the Russian regions 1995.



Source: Statistisches Bundesamt 1996, 14.

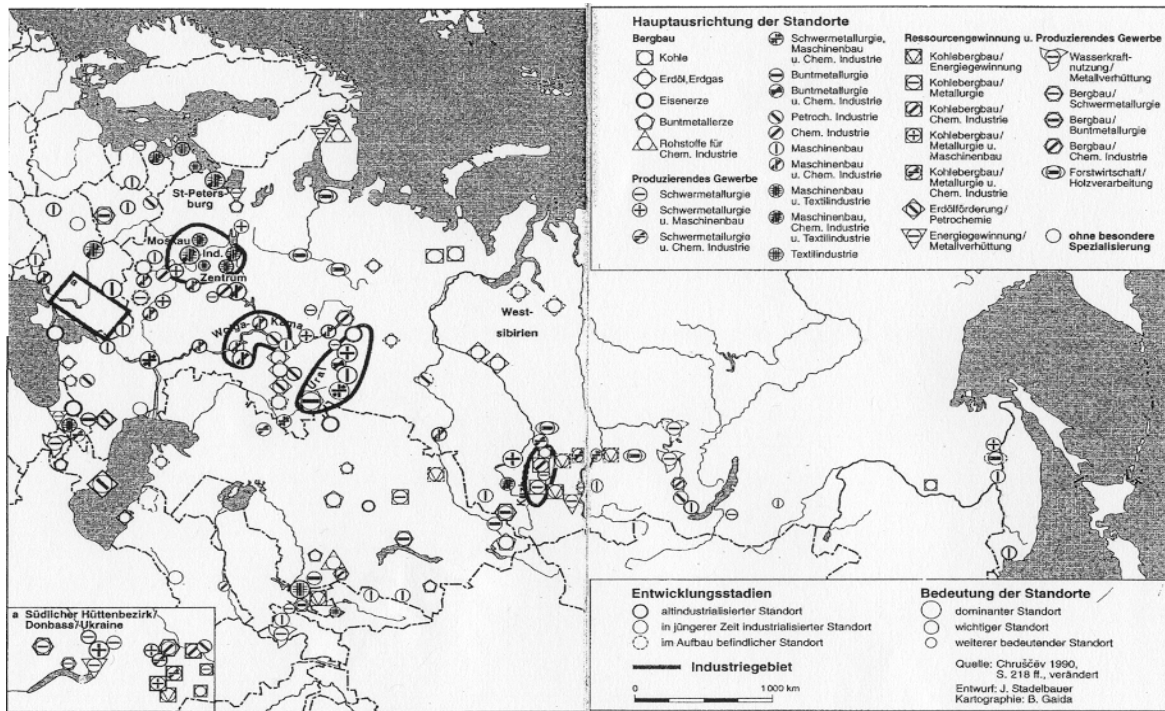
Figure A-2: Industrial districts in the Soviet Union in the 1980s.



Source: Stadelbauer 1996, 536f.

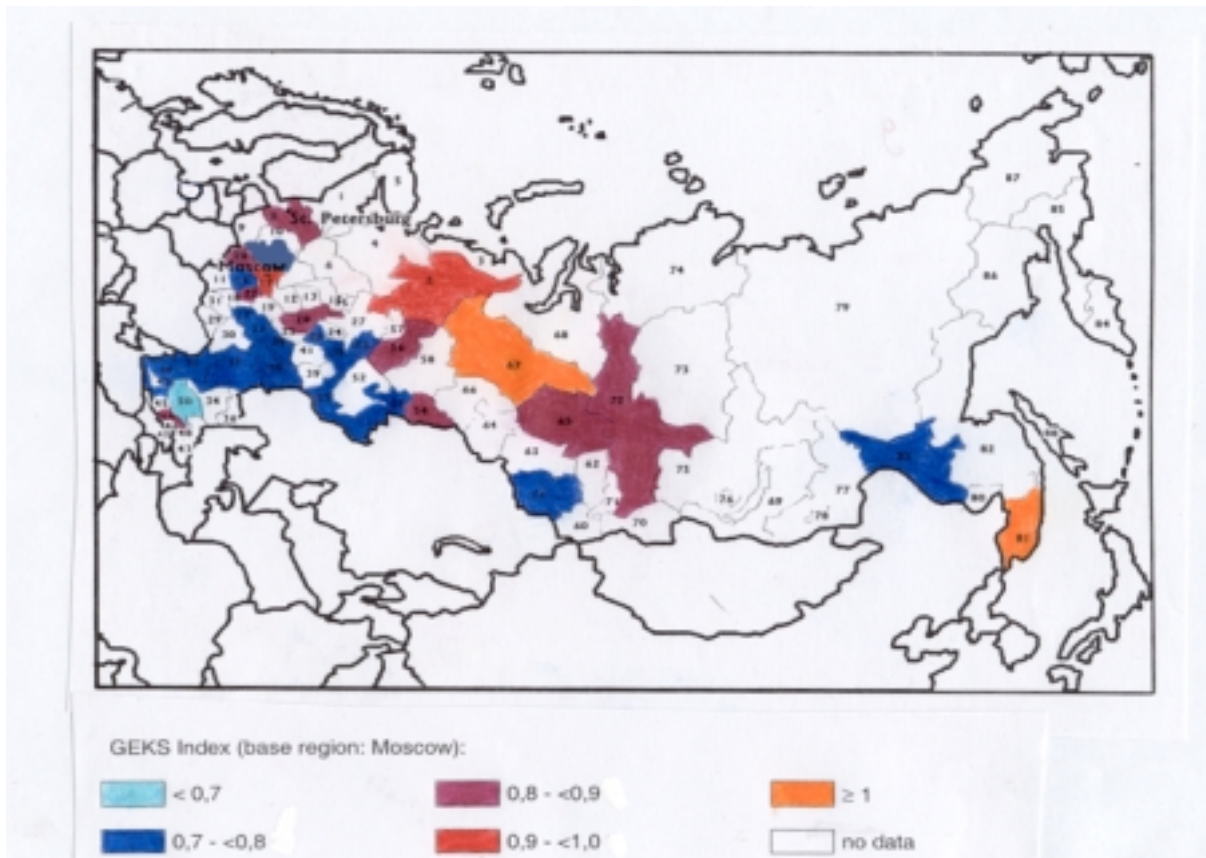


Figure A-3: Centres of high-technology industries in the Soviet Union in the 1980s.



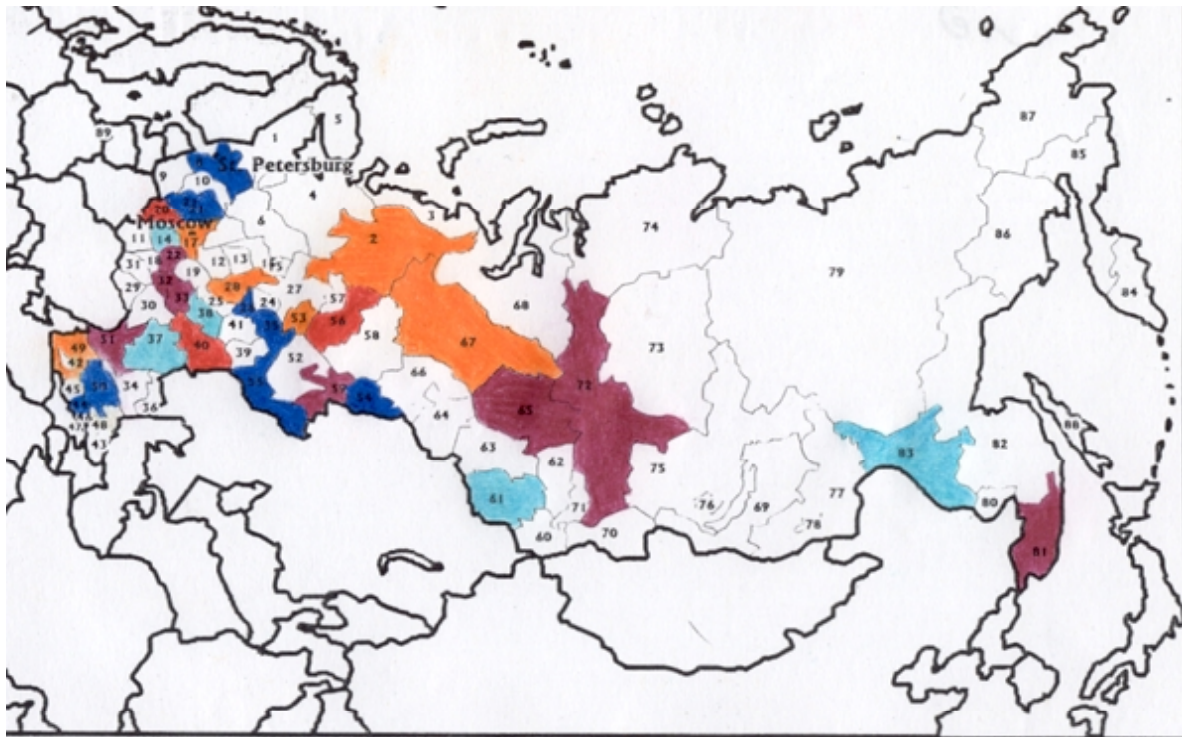
Source: Stadelbauer 1996, 523.

Figure A-4: Cost of living based on consumption of nutritional products in Russian Provinces, end of 2000.



Source: Own calculations with RLMS data.

Figure A-5: Real household incomes in Russian Regions, end of 2000.



Household Equivalence Incomes in Purchasing Power of a Moscow Ruble



Source: Own calculations with RLMS data.