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Anatomy of Russia's Market Segmentation*

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Abstract

Based on a relationship between price difference and demand difference among locations, the role of various market frictions in causing segmentation of the Russian goods market is analyzed. The spatial sample covers most of Russian regions (70 of all the 89); the data are yearly, spanning 1992 through 2000. Spatial disconnectedness of regions is found to be responsible for about 70 percent of average price differential, while the rest is caused by “artificial” impediments to market integration such as shipping conditions, regional protectionism, and organized crime.

JEL classification: P22, R10, R15.

Keywords: Market integration, law of one price, market frictions, Russian regions.

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1. Introduction

During the first decade of transition, the pattern of integration among regional goods markets in Russia has been changing dramatically. As Gluschenko (2003) found, the degree of Russia's market segmentation rose sharply after the price liberalization of January 1992. A turning occurred about the end of 1994, and since then integration tended almost steadily to improve. Results by Berkowitz and DeJong (2001), albeit obtained for a shorter time interval with the use of a different methodology, are, in general, in close agreement with this pattern. By 2000, the degree of integration of the Russian market (excluding difficult-to-access regions) became comparable to that of the US market, according to Gluschenko and Kulighina (2006), although neither market was found to be completely integrated.

Given this temporal pattern of market integration in Russia, the next question concerns the reasons lying behind it. Answering this implies dissecting the segmentation measure to investigate its "anatomy." This paper therefore develops the study presented in Gluschenko (2003), proceeding from basically the same methodology and raw data for the dependent variable.

The issue of market integration in contemporary Russia was examined by Gardner and Brooks (1994), De Masi and Koen (1996), and Goodwin *et al.* (1999). Having found indications of Russia's market segmentations, they could only guess as to culprits behind it, since they exploited the time-series analysis which provided no possibilities to estimate the effect of market frictions. Using cross-sectional approach, Berkowitz and DeJong (1999) found an interesting culprit explaining market segmentation, a group of anti-reform regions called the Red Belt. More recently, Berkowitz and DeJong (2001) estimated a degree of integration for a sequence of points in time (integration trajectory). They deemed a region integrated if there was a dependence of price dispersion among it and other regions on inter-regional distances, the degree of integration being the share of integrated regions. Having estimated the integration trajectory, they analyzed the effect of political and macroeconomic environment on it. Their variables characterized changes in transportation costs, openness to international trade, public discontent, and standard of living. In Berkowitz and DeJong (2003), a wider set of explanatory variables was used, a number of region-specific ones among them. These were: changes in regional transportation costs, poverty, initial income, inter-regional income disparities, education, and language. As seen, most of variables characterize forces that influence inter-regional market frictions very indirectly.

This paper differs in two aspects. First, it uses a different approach to measuring market integration. As follows from the law of one price, the price of a (tradable) good in a region

should not depend on demand for the good there. Based on this, the strength of relationship between regional price and regional demand is taken as the degree of market segmentation, the absence of such a dependence indicating integration of the market. This relationship is transformed to a relationship between inter-regional price differential and per capita income differential, so yielding a testable version. Second, the set of explanatory variables characterizes forces that (more or less) immediately affect local prices, hence, inter-regional price differences. In other words, these are forces that account for inter-regional market frictions (integrally reflected by the segmentation measure) and can be correlated with specific components of arbitrage transaction costs or price distortions.

The spatial sample covers most of Russian regions (70 of all the 89); the data are yearly, spanning 1992 through 2000. The cost of a staples basket is used as a price representative; the explanatory variables characterize spatial disconnectedness of regions, shipping conditions, regional protectionism, organized crime, and distribution costs. All data are region-specific. The estimations were run both for each year and the entire 1993-2000 panel.

Spatial disconnectedness of regions is found to be responsible for about 70 percent of average price dispersion, while the rest is caused by “artificial” impediments to market integration (shipping conditions, regional protectionism, organized crime, etc.). However, a third to a half of contribution of these impediments is due to unidentified market frictions. The Moscow market proves to contribute significantly to the overall segmentation of the Russian goods market: when Moscow is excluded from the sample, the proportion of unidentified frictions falls up to a half.

The rest of the paper is organized as follows. The next section presents theoretical considerations for estimating the role of market frictions in market segmentation and econometrical methodology. Section 3 describes the data used. In Section 4, empirical results are presented and discussed. Section 5 concludes.

2. Methodology

This section briefly describes the methodology for assessing the degree of market integration based on the more detailed account in Gluschenko (2003).

Consider a market for a tradable good consisting of a great number of spatially separated sub-markets (regions of a country) $\{r\}$. Taking all variables as logarithms, let P_r be the price of the good in region r , I_r the per capita income, $Q_r = D(P_r, I_r)$ the demand function (assuming I_r is the only determinant of demand apart from price), and $Q_r = S(P_r)$ the supply function. Assume local quantities are negligibly small compared to their total across all locations. Regions are linked by arbitrageurs (also supposed to be numerous) so that no monopolistic effects occur,

even if the good is not produced in some regions. By moving the good to or from the region, arbitrageurs adjust the quantity supplied when the local price increases or decreases due to changes in local demand (e.g., because of variations in per capita income).

A market is deemed integrated when such an adjustment leads prices to equalize across regions such that the law of one price holds. Perfect integration implies there are no impediments (for the time being physical distances apart) to the movement of the good between regions, and the market operates like a single perfectly competitive market. Thus, the price of the good in any region is determined by the national market, not local demand. From the viewpoint of an individual region, the supply curve S is perfectly elastic. The presence of impediments to inter-regional trade causes the market to be segmented. These impediments are quantified as arbitrage transaction costs needed to move a unit of the good between s and r . In the segmented market, prices differ across regions, resulting in a dependence of local prices on local demand. (In fact, inter-regional price differences can be caused also by price distortions; see below.)

From the above considerations, it follows that the dependence of local prices on local demand could be used to detect and measure market segmentation. However, data on the quantities demanded are, as a rule, unavailable. Therefore, it is more convenient to derive a relationship between prices and incomes as a testable version. The equilibrium condition

$$D(P_r, I_r) - S(P_r) = 0 \quad (1)$$

yields $P_r = f(I_r)$. It is important to note that while demand $D(P_r, I_r)$ is a local one, supply $S(P_r)$ is not that of local producers only, being formed jointly by producers from all regions through the inter-regional arbitrage. It is this that makes $S(P_r)$ to be a horizontal line when there are no market frictions, or something like a logistic curve in the presence of impediments to arbitrage.

With some additional assumptions, $f(I_r)$ can be represented as a log-linear function

$$P_r = \kappa + \beta I_r. \quad (2)$$

Subtracting (2) for some region s from that for r , an equation in terms of percentage differentials, $P_{rs} \equiv P_r - P_s$, $I_{rs} \equiv I_r - I_s$, gives (throughout the paper, r and s are arranged so that $P_{rs} \geq 0$):

$$P_{rs} = \beta I_{rs}. \quad (3)$$

Although (3) is a pairwise comparison, the region pair (r, s) is not dealt with in isolation. The rest of regions act “behind the scene,” forming supplies in r and s , and so, influencing on the value of β .

As (1) holds for each I_r , the derivative of its left-hand side with respect to I_r equals zero. From this we obtain

$$dP_r/dI_r = -\varepsilon_I/(\varepsilon_D - \varepsilon_S), \quad (4)$$

where ε_I is the income elasticity of demand (the good is assumed normal), and ε_D and ε_S are the

price elasticities of demand and supply. Hence, $\beta = dP_r/dI_r \geq 0$. With finite ε_s , β is positive. However, $\beta = 0$ in a perfectly integrated market, i.e. β vanishes as supply approaches perfect elasticity ($\varepsilon_s \rightarrow \infty$).

Thus, relationship (3) can be used as a cross-sectional test for market segmentation. A positive value of β indicates that local markets are not perfectly integrated. The magnitude of β (the elasticity of price dispersion vis-à-vis income dispersion) can be used as a measure of the degree of market segmentation (or, conversely, integration): a higher value for β means higher segmentation (or weaker integration). If $\beta = 0$ holds over a set $\{(r, s)\}$, implying the law of one price holds, then the relevant market can be deemed integrated.

In a large country, segmentation of markets by physical distance is inevitable. Therefore, it is reasonable to treat it as an allowable market friction. To control for transportation costs, T_{rs} , the price differentials should be cleaned from them (so using a weaker version of the law of one price): $P_{rs} - T_{rs} = \beta I_{rs}$ or $P_{rs} = \beta I_{rs} + T_{rs}$. By assuming transportation costs to be log-linear function of physical distance, $T_{rs} = \alpha_0 + \gamma L_{rs}$, the following equation is arrived at:

$$P_{rs} = \alpha_0 + \beta I_{rs} + \gamma L_{rs}, \quad (5)$$

where L_{rs} is log physical distance separating regions r and s . If difference in prices is due to only the costs of shipping goods, i.e., $P_{rs} = T_{rs}$, then it will be $\beta = 0$ and the market is recognized as integrated. Taking into account random shocks, ε_{rs} , we obtain an econometric version of (5):

$$P_{rs} = \alpha + \beta I_{rs} + \gamma L_{rs} + \varepsilon_{rs}. \quad (6)$$

This regression is estimated over a set of $N \times (N-1)/2$ region pairs (r, s) for a given point in time or over a panel $T \times N \times (N-1)/2$, where N is the number of regions and T is the time dimension of panel. It is this model that Gluschenko (2003) uses to estimate dynamics of market integration in Russia, running the regression for a sequence of points in time.

In general, there are two culprits forcing prices in r and s to differ: arbitrage transaction costs (transportation costs among them) and price distortions. The latter are distribution costs, local sale taxes, subsidization, and price regulations. Let us consider them by the example of distribution costs, assuming these to be the only price distortion and the rest difference in prices to be caused by arbitrage transaction costs C_{rs} . Given the percentage of distribution costs in the retail price of the good, d_r , we have $P_r + D_r = P_s + C_{rs} + D_s$, where $D_r = \ln(1 - d_r)$, similarly for s . Thus, $P_{rs} = C_{rs} - D_{rs}$, $D_{rs} \equiv D_r - D_s = \ln((1 - d_r)/(1 - d_s))$. However, the true value of D_{rs} is not, as a rule, known (e.g., aggregated statistical data on distribution costs are available, not for specific goods). That is, D_{rs} will be represented by a proxy, and so, $P_{rs} = C_{rs} - \alpha_{(d)} D_{rs}$, where $\alpha_{(d)}$ is a coefficient to be estimated.

Except for transportation costs, other available components of arbitrage transaction costs

are region-specific rather than region-pair-specific. Therefore, the above considerations are valid for them as well. Thus, variables from both groups can be represented uniformly as $X_{irs} = X_{ir} - X_{is}$, where X_{il} is the value of i -th indicator characterizing a market friction or price distortion in region l .¹ Such a symmetry is very helpful, since it is not always possible to separate price distortions and components of arbitrage transaction costs; moreover, some anti-integration forces have a combined effect. For example, organized crime can both distort prices through “criminal taxes” by racket and impede inter-regional trade (see Gluschenko, 2007).

Supplementing the right-hand side of model (6) with additional explanatory variables X_{irs} , the model is modified so that it can estimate roles played by various factors in market segmentation. After modification,

$$P_{rs} = \alpha_0 + \beta^* I_{rs} + \gamma L_{rs} + \sum_i \alpha_i X_{irs} + \varepsilon_{rs}. \quad (7)$$

If the set $\{X_{irs}\}$ plus the distance variable were exhaustive, i.e., characterized all price distortions and components of arbitrage transaction costs, the dependence of price differential on income differential would vanish. However, it is hardly possible to collect a complete set of data on price distortions and market frictions. Therefore, this dependence weakens but still takes place due to missing variables; and it is reasonable to expect that $0 < \beta^* < \beta$. In contrast to (6), β^* indicates the total effect of unidentified factors rather than the degree of market segmentation. Since except for the physical distance variable, all other variables are constructed as differences, the intercept in (7) is due to only L_{rs} , being a scale factor of physical distance. Therefore, both coefficients α_0 and γ reflect the effect of physical distance on price differential.

3. Data

The price index used for the statistical analysis is the cost of the basket of 25 basic food goods; this basket covers about one third of foodstuffs involved in the Russian consumer price index.² The data were obtained from the Russian statistical agency, Goskomstat (at present, Rosstat). See Gluschenko (2003) for more detailed description of this data set. The raw data are monthly, spanning 107 months, from February 1992 up to December 2000. Since data on price distortions and market frictions are not available on a monthly basis, the price index is averaged over each year (for 1992, over its 11 available months). Despite high and variable inflation during the early years of transition, this averaging is reasonable, as the focus here is the relative prices across regions, not their absolute values.

¹ Note that the sign of variable in the theoretical equation depends on specific construction of the variable; e.g., be d_r and d_s extra charges to the wholesale price, D_{rs} would be positive.

² By Goskomstat (1996a), the basket includes: rye-and-white bread, white bread, flour, rice, millet, vermicelli, potatoes, cabbages, carrots, onions, apples, sugar, beef, fowl, boiled sausages, boiled-and-smoked sausages, frozen fish, milk, sour cream, butter, curd, cheese, eggs, margarine, and vegetable oil.

Incomes are drawn from the monthly statistical bulletin “Social and Economic Situation of Russia” for 1992-2000. They are temporally averaged in the same manner like price data.

The price-distortion and market-friction variables are defined as follows.

Spatial disconnectedness of regions is represented by two variables: physical distance and difficult access to a number of regions. Physical distances are measured between capital cities of regions in network-transportation mileage. The railroad distances are drawn from the Tariff Manual (1965). They are updated and supplemented with highway, sea, and river distances for regions lacking railway communication with the use of modern geographical atlases.³ The difficult-access variable is a dummy: X_{ir} equals 1 if r is a difficult-to-access region (see their list below) and 0 otherwise; thus, $X_{irs} \in \{1, 0, -1\}$.

Shipping conditions. Two variables are adopted to proxy this market friction: the quality of a region’s transport infrastructure and the regional freight tariff. The former is drawn from Matiyasevich et al. (1998). Their original index is reversed by subtracting it from 1, so that the larger the number, the worse the region’s transport infrastructure; the index varies from 0 to 1 (hence, it represents an index of infrastructure imperfection). To construct the regional freight tariff variable, yearly regional freight-tariff indices from Goskomstat (2000) are used. For a given year, the base index is calculated by the chain method, taking 1991 as 1. Thus, this is the level of within-region freight tariff at the end of a year (related to the level of 1991).

Regional protectionism is represented by belonging to the Red Belt, price regulations, and subsidization. The Red Belt variable is a dummy: X_{ir} equals 1 if r is a region from the Red Belt according to Berkowitz and DeJong (1999) and 0 otherwise; thus, $X_{irs} \in \{1, 0, -1\}$. It is the only indirect variable interpreted as an indicator of anti-market attitude of region’s authorities.⁴ Distrusting market, authorities of such regions actively intervened to its work, controlling prices, broadly subsidizing local producers, “protecting” regional market by impeding inter-regional trade, etc. The indicator of price regulations is the proportion of goods and services with non-regulated prices in the region in the first quarter of 1996; the data source is Goskomstat (probably, not published). The measure of subsidization is subsidies to producers as the inverted proportion of the regional budget expenditures in 1995 according to RECEP (the initial source is unknown). The same values are used for the whole time span under consideration. (Beyond the

³ The distance matrix was compiled by Alexei Abramov, Novosibirsk State University.

⁴ Berkowitz and DeJong (1999) identify regions as lying within the Red Belt if they preferred the opposition Communist Party led by Zyuganov against the reformist incumbent Yeltsin during both rounds of the 1996 Presidential elections. Thus, this identification bases on *population’s* opinion. But, on the one hand, the negative attitude of most population to market reforms resulted in that persons sharing such an attitude were elected members of regional authorities with higher probability. On the other hand, anti-reform regional authorities could influence on population’s will during the Presidential elections in a relevant direction (using various administrative methods, putting pressure upon regional mass media, etc.).

years for which these indicators were calculated, they are interpreted as proxies for propensity to regulate prices and subsidize production.)

Organized crime. Two proxies of organized crime are available. The first is the total crime rate, i.e., the number of registered crimes per 100,000 of the region population by year. The source of data is Goskomstat (2000). The second proxy describes economic power of crime as the proportion of the regional economy controlled by criminal groups in 1995/1996 according to Kakotkin (1996). Following Brown and Earle (2000), the relevant regional variable X_{ir} is quantified as equaling 1 if criminal groups control more than 50% of the economy in region r , 0.75 if they control 35-50%, 0.5 if they control 20-35%, and 0.25 if they control less than 20%. This variable is static; the same values are used for the whole time span under consideration. Correlation between two measures of organized crime is weak, 0.095 as a maximum; its sign varies across years and region samples. This suggests that two proxies of organized crime are far from being simply versions of each other. Supposedly, they reflect two different dimensions of organized crime (both being merely a rough approximation of it). That is why both the variables are contemporaneously included into the regressions.

Distribution costs are constructed as described in Section 2 from trading costs relative to retail sales by region; the indicator is computed over large and medium-sized shops by region. The sources of the data are Goskomstat (1996b) and Goskomstat (1998). The data for 1992 and 1998-2000 are lacking; values for 1997 are extended to 1998-2000. However, a similar way is hardly proper for 1992; therefore this variable is omitted in regressions for 1992, and the year 1992 is not included in panels.

Of course, the above list is far from complete. There are barriers to inter-regional trade in Russia for which complete information is not available, for example, data on administrative restrictions on export of subsidized agricultural and food products that took place from time to time in some regions. Some market frictions are unobservable and hardly quantifiable, e.g., insufficient information on arbitrage opportunities, institutional factors (such as long-term contracts, partnership traditions, and the reputation of potential counteragents), etc. Therefore, it is reasonable to expect that a sizable part of market segmentation will remain unexplained, being attributed to unidentified market frictions integrally estimated by β^* .

The spatial sample covers 70 of Russia's 89 regions. Complete data are lacking for 10 autonomous *okrugs*, the Chechen Republic, republics of Ingushetia, Adygeya, and Dagestan, the Jewish Autonomous Oblast, and Murmansk and Volgograd *oblasts*. Besides that, two more regions are omitted. The city of Moscow is a "city-region", being a separate subject of the Russian Federation, and at the same time the capital city of the surrounding Moscow Oblast; the same holds for St. Petersburg and the Leningrad Oblast. Therefore only these "city-regions" are

present in the sample, while the relevant surrounding *oblasts* are not.

The basic spatial sample, hereafter referred to as “Russia as a whole”, yields a cross-section of 2,415 (= 70×69/2) region pairs. In addition, estimations are run over two subsamples.

One of them represents Russia excluding difficult-to-access regions. This sample includes 66 regions (2,145 region pair); excluded are the Republic of Sakha (Yakutia), Sakhalin Oblast, Magadan Oblast, and Kamchatka Oblast. These are remote regions lacking railway and highway communication with other regions. Therefore, arbitrage can hardly be bilateral there, goods being imported only in these regions. Obviously, difficult access to a number of regions worsens integration of the national market. And so, eliminating such regions is equivalent to controlling for this “natural” impediment to integration.

Another sample represents the European part of Russia excluding its northern territories; it is hereafter referred to as simply “European Russia”; there are 48 regions (1,128 region pairs) in the sample. Since the transport infrastructure is more developed in this part of the country, and distances are shorter, one might *a priori* expect European Russia to be more integrated than the remainder of the country. Therefore it is interesting to examine this expectation empirically.

4. Empirical results

Unconditional correlations of regional indicators X_{ir} with regional prices P_r presented in Table 1 give an idea of directions and extents of influence exerting by different factors on prices. The correlation coefficients are computed for Russia as a whole over 71 to 74 regions depending on availability of data.

Table 1 here

The results in Table 1 are quite expectable: on the one hand, the worse the shipping conditions, the more intensive the crime, and the greater distribution costs, the higher prices; on the other hand, the stronger regional protectionism, the lower prices. But irrespective of the direction of impact, all these forces eventually increase price dispersion in the country, as unconditional correlations of pairwise variables X_{irs} with price differential P_{rs} presented in Table 2 evidence. The correlation coefficients in this table are computed also for Russia as a whole over its 2,415 region pairs.

Table 2 here

Thus, the sign of coefficient on every X_{krs} is expected to be positive; however, taking

account of the joint impact of all variables (i.e., conditional correlation) may change their roles in market segmentation. Table 3 tabulates estimates of regression (7) by year and spatial sample.

Table 3 here

Coefficients in (7) are elasticities which display sensitivity of price dispersion to changes in explanatory variables. However, their estimates by themselves do not indicate the significance of a particular factor in causing inter-regional price differences. And so, before discussing the role of specific impediments to market integration, let us consider their economic significance. Following Engel and Rogers (1996), the economic significance of an explanatory variable can be measured by the contribution of its average to the average of the dependent variable. The contribution of a variable, say X_{irs} , to the average price dispersion may be calculated as $\hat{\alpha}_i \bar{X}_i / \bar{P}$. On the other hand, a portion in the total (average) price dispersion is due to the natural, unavoidable market friction caused by the spatial disconnectedness of regions. That is why we also compute the contribution of the explanatory variables to price dispersion less its geographically determined part, i.e. with the appropriate reduction for distance in average price dispersion: $\hat{\alpha}_i \bar{X}_i / (\bar{P} - (\hat{\alpha} + \hat{\gamma} \bar{L}) - \hat{\alpha}_{(da)} \bar{X}_{(da)})$ for Russia as a whole, (da) being a substitute of i for the variable of difficult access, and $\hat{\alpha}_i \bar{X}_i / (\bar{P} - (\hat{\alpha} + \hat{\gamma} \bar{L}))$ for the other two spatial subsamples. Table 4 presents these results; to save space, the contributions of specific variables are aggregated into those of variable groups.

Table 4 here

There are only two cases of statistically insignificant β^* (European Russia, 1992 and 1993). This implies that – as would be expected – the variables used do not represent all reasons of inter-regional price differences. As Table 4 suggests, geographical reasons are responsible for the main portion of price dispersion: from about 50 percent to more than 80 percent. The rest is due to forces impeding market integration and to those distorting inter-regional price differences. In it, the share of unidentified market frictions is rather great, amounting, for the most part, between one third and two thirds.

Freight tariff has a positive sign in all cases. There are only five cases of statistical insignificance: in 1992 for all three samples, and in 1993 and 1997 for European Russia. Its contribution to the total price dispersion is 0.7 to 2.3 percent. Excluding geographically determined part of price dispersion, the contribution of freight tariff becomes sizeable: up to 9

percent in Russia as a whole and up to 13 in Russia excluding difficult-to-access regions. However, it is of no importance in European Russia, increasing price dispersion by no more than 1.5 percent.

Imperfectness of transport infrastructure is statistically insignificant in only five cases. But the estimates are paradoxical, as about a half have the incorrect sign. This means that the more the difference in quality of transport infrastructure between regions, the less the price difference between them. As a result, the contribution of this market friction to price dispersion turns out to be negative. The reason of this pathology will be discussed below.

The Red Belt is statistically significant and has the correct sign in all cases. The price regulations variable is statistically significant in five years (of all the 9 under consideration) for Russia as a whole, and in four years for Russia excluding difficult-to-access regions. Along with this, except for 1999-2000, all statistically significant estimates for these samples are negative. In European Russia, all but one estimates are statistically significant and positive. It can be concluded herefrom that price regulations in 1992-1998 yielded dissimilar results in different spatial part of the Russian food market. In the Asian part of the country, including difficult-to-access regions, it decreased price dispersion, while in the European part this measure increased inter-regional price differences. However, starting in 1999, price regulations lost their “smoothing” role, forcing price dispersion to increase everywhere. Subsidization is statistically significant in seven cases, two significant estimates having a wrong sign. Thus, the support of local producers results, as the rule, in intensifying price disparities between regions. In total, regional protectionism is responsible for increasing the overall price dispersion by 1.5 to 5.6 percent in the whole country (taking both subsamples) and by 4.7 to 14.4 percent in European Russia. While a trend toward weakening regional protectionism is seen in 1992-1998, since 1999 it strengthened again.

There are three cases of statistical insignificance of crime rate, and three cases of that of economic power of crime. For the most part, both variables are statistically significant, and there is no one case of both being insignificant. Except for four cases, statistically significant estimates of both variables have the expected positive sign, so suggesting that actions of organized crime increase inter-regional price dispersion and are a sufficient impediment of market integration in Russia.⁵ As seen from Table 4, the contribution of organized crime is substantial, coming up to 18 percent in the total price dispersion. However, it tends to decrease over time; the effect of organized crime on inter-regional price dispersion rises in the early years of transition, and then it is decreasing.

⁵ A separate paper, Gluschenko (2007), is devoted to the role played by organized crime in segmentation of the Russian market. In that paper, the underlying mechanism of effect of organized crime on consumer goods prices is considered, and the estimation results are discussed in detail. That is why this issue is touched on only briefly here.

There are, however, some deviations from the latter trend. It is possible that they are concerned with the financial crisis of 1998 and its consequences. While almost having disappeared in 1999, the contribution of organized crime to price dispersion dramatically increased in 2000. But it would be better to keep from explaining this phenomenon. The point is that as we move farther and farther from 1995-1996, the indicator of economic power of organized crime (evaluated in those years) becomes progressively less reliable. It is not inconceivable that the distribution of the economic power of organized crime over the territory of Russia differed by 2000 (maybe, even earlier) from that used for the analysis. And so, the reliability of estimates decreases.

Distribution costs in retail trade have a low profile in 1993-1995. Since 1996, its role became more important, the difference in distribution costs caused one fifth to more than one third of the price dispersion less its geographically determined part. But this does not concern European Russia, where distribution costs caused only small fraction of price dispersion during the whole period of 1993-2000, or even had negative relation with price dispersion.

A general pattern of the role of different market frictions in market segmentation is provided by panel estimates over the whole period of 1993-2000 (Recall that 1992 is omitted because of lack of data on distribution costs for this year.) Table 5 presents panel estimates of regression (7) and Table 6 tabulates the contributions of market frictions to price dispersion.

Table 5 here

Table 6 here

All panel estimates, except the only, are significant at the level of better than 1 percent. Insignificant is transport infrastructure in Russia excluding difficult-to-access regions. Geographical reasons, namely physical distance and difficult access to a number of regions, cause about 70 percent of price dispersion. In its rest part, a one third to a half is due to unidentified impediments to market integration. About 10 percent in Russia as a whole and excluding difficult-to-access regions is caused by shipping conditions; the impact of them in European Russia is somehow weaker. Regional protectionism has a relatively weak impact on price differences in Russia as a whole and excluding difficult-to-access regions, contributing 6.2 and 8.3 percent correspondingly. The reason is that price regulations and subsidization act here in opposite directions: the former smoothes price differences, while the latter increases them, which results in that they almost cancel each other. But they both widen price gaps in European Russia, acting in the same direction; besides, other protectionist measures captured by the Red

Belt variable are much more pronounced here. In total, regional protectionism contributes 32.3 percent to the “artificial” part of price dispersion. The main role in market segmentation in differences in Russia as a whole and excluding difficult-to-access regions belongs to organized crime which is responsible for 28.6 and 35.5 percent of that part of price dispersion. In European Russia, the figure is 17.2 percent. Distribution costs have a minor effect in European Russia (even decreasing price dispersion), while causing circa 11 percent of price differences in two other spatial samples.

Let us turn to the strange role played by transport infrastructure: the above estimates suggest that sometimes the better the infrastructure in a region, the higher the prices in it. This oddity is due to the market of Moscow, where transport infrastructure is “perfect” (the value of the transport infrastructure imperfectness equals 0), while the cost of the staples basket is almost the highest in the country, for the most part yielding only to difficult-to-access regions. Thus, the above relationship is indeed valid for Moscow. Although that is not the case for remaining regions, where poor quality of transport infrastructure causes, as it must, rise in transportation costs. The presence of the Moscow market – with its “atypical” relationship between quality of infrastructure and prices – in the samples distorts the “typical” relationship. Not infrequently this distortion prevails, resulting in the paradoxical negative sign of estimates of the coefficient on the relevant variable. This is evident from the 1993-2000 panel estimates across samples where Moscow is omitted. These estimates are tabulated in Table 7, while contributions of market frictions to the average price dispersion are tabulated in Table 8.

Table 7 here

Table 8 here

The dropping of Moscow clears things up: transport infrastructure now has positive sign, so suggesting a direct dependence of price dispersion on imperfection of infrastructure; in European Russia, this variable turns out to be insignificant. Its contribution to price dispersion (less its geographically determined part) in Russia as a whole and excluding difficult-to-access regions equals 12.1 and 9.0 percent correspondingly. Insignificance of transport infrastructure in European Russia is caused by the fact that the quality of infrastructure varies only slightly across regions of this part of the country. Interestingly, the contribution of unidentified market frictions decreases 1.6 to 2.2 times (as compared to Table 6). This suggests that the Moscow market in itself is a sufficient reason of the overall segmentation of the national market. Changes in contributions of freight tariff, the regional protectionism variables, and distributions costs are

minor. However, the contribution of organized crime increases dramatically, roughly 1.5 to 2 times. One could conclude herefrom that high prices in Moscow go with relatively low level of organized crime. But it seems that this probably is not the case. More likely, the values of organized crime indicators are understated for Moscow because of more latent organized crime or/and more corrupted law machinery here.

Figure 1, constructed of data from Tables 6 and 8, provides a pictorial rendition and summarization of considered results. It displays contributions of aggregated market frictions to the average price dispersion less its geographically determined part over 1993-2000.

Figure 1 here

Taking the market of Russia as whole, the main reasons of segmentation are shipping conditions and organized crime. The difference in distribution costs adds 11 percent to this. The dropping of Moscow does not sufficiently change the qualitative pattern. Such a pattern is also similar not depending of taking account of difficult-to-access regions. The main reasons of market segmentation in European Russia are regional protectionism and organized crime. Shipping conditions contribute a little, but this is due to the Moscow market; when Moscow is excluded from the samples, this contribution practically vanishes.

5. Conclusions

Using data across 70 (of all the 89) Russian regions from 1992 through 2000, the role played by different market frictions and price distortions in country's market segmentation has been analysed. "Natural," irremovable impediments to market integration, namely, physical distance and difficult access to a number of regions, are responsible for about 70 percent of the average price dispersion. The rest is mostly caused by "artificial" barriers to inter-regional trade such as shipping conditions, regional protectionism, and organized crime.

The most sufficient segmentation force in 1993-2000 was organized crime, although its role in impeding market integration became less important over time. In European Russia, a comparable importance had regional protectionism. The Moscow market is found to significantly contribute to the overall segmentation of the Russian goods market.

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Table 1. Correlation of regional indicators with the cost of the staples basket

Indicator	Correlation coefficient by year								
	1992	1993	1994	1995	1996	1997	1998	1999	2000
Difficult access	0.622	0.738	0.812	0.757	0.806	0.817	0.835	0.809	0.807
Transport infrastructure	0.303	0.327	0.385	0.391	0.409	0.409	0.318	0.223	0.238
Freight tariff	0.039	0.295	0.226	0.215	0.189	0.173	0.246	0.133	0.171
Red Belt	-0.430	-0.373	-0.334	-0.381	-0.306	-0.316	-0.357	-0.388	-0.373
Price regulations	-0.277	-0.207	-0.175	-0.198	-0.156	-0.139	-0.152	-0.197	-0.209
Subsidization	-0.293	-0.241	-0.257	-0.272	-0.230	-0.186	-0.200	-0.253	-0.223
Crime rate	0.497	0.522	0.548	0.538	0.202	0.376	0.308	0.169	0.244
Economic power of crime	0.267	0.341	0.342	0.371	0.321	0.315	0.332	0.303	0.322
Distribution costs	NA	0.628	0.584	0.678	0.685	0.691	0.623	0.568	0.576

Table 2. Correlation of explanatory variables with the price differential

Variable	Correlation coefficient by year								
	1992	1993	1994	1995	1996	1997	1998	1999	2000
Physical distance	0.317	0.486	0.622	0.622	0.646	0.669	0.582	0.483	0.566
Difficult access	0.433	0.600	0.758	0.709	0.788	0.808	0.825	0.788	0.793
Transport infrastructure	0.188	0.225	0.278	0.280	0.286	0.310	0.226	0.151	0.167
Freight tariff	0.045	0.118	0.103	0.077	0.061	0.080	0.103	0.071	0.085
Red Belt	0.207	0.202	0.187	0.196	0.195	0.178	0.208	0.190	0.203
Price regulations	0.195	0.125	0.132	0.128	0.121	0.101	0.133	0.151	0.147
Subsidization	0.195	0.138	0.107	0.102	0.078	0.052	0.063	0.091	0.045
Crime rate	0.329	0.300	0.364	0.296	0.156	0.199	0.128	0.026	0.087
Economic power of crime	0.174	0.261	0.262	0.287	0.241	0.207	0.225	0.222	0.242
Distribution costs	NA	0.450	0.463	0.614	0.581	0.620	0.531	0.486	0.484

Table 3. Structure of price differential: estimates of regression (7) by year

Year	Variable	Russia as a whole	Excluding difficult-to-access regions	European Russia
1992	Income	0.092 (0.009) ^{***}	0.076 (0.009) ^{***}	-0.011 (0.018)
	Physical distance	0.008 (0.003) ^{***}	0.006 (0.003) [*]	0.003 (0.005)
	Difficult access	0.155 (0.012) ^{***}		
	Transport infrastructure	-0.060 (0.013) ^{***}	-0.057 (0.014) ^{***}	-0.073 (0.022) ^{***}
	Freight tariff	0.001 (0.004)	0.003 (0.004)	0.001 (0.006)
	Red Belt	0.021 (0.004) ^{**}	0.020 (0.004) ^{**}	0.042 (0.007) ^{***}
	Price regulations	0.003 (0.004)	0.004 (0.004)	0.013 (0.005) ^{**}
	Subsidization	0.045 (0.006) ^{**}	0.041 (0.006) ^{***}	0.039 (0.010) ^{***}
	Crime rate	0.153 (0.008) ^{***}	0.141 (0.008) ^{***}	0.129 (0.013) ^{***}
	Economic power of crime	0.005 (0.008)	0.003 (0.008)	-0.022 (0.011) ^{**}
	Distribution costs	NA	NA	NA
1993	Income	0.061 (0.010) ^{***}	0.040 (0.010) ^{***}	0.002 (0.019)
	Physical distance	0.038 (0.004) ^{***}	0.038 (0.004) ^{***}	-0.003 (0.007)
	Difficult access	0.280 (0.015) ^{***}		
	Transport infrastructure	-0.139 (0.018) ^{***}	-0.131 (0.020) ^{***}	-0.171 (0.025) ^{***}
	Freight tariff	0.017 (0.003) ^{***}	0.018 (0.003) ^{***}	0.002 (0.004)
	Red Belt	0.029 (0.005) ^{***}	0.028 (0.005) ^{***}	0.043 (0.007) ^{***}
	Price regulations	-0.006 (0.005)	-0.005 (0.005)	0.017 (0.006) ^{***}
	Subsidization	0.043 (0.007) ^{***}	0.041 (0.007) ^{***}	0.048 (0.011) ^{***}
	Crime rate	0.153 (0.009) ^{***}	0.145 (0.010) ^{***}	0.111 (0.014) ^{***}
	Economic power of crime	0.060 (0.011) ^{**}	0.060 (0.011) ^{***}	0.040 (0.013) ^{***}
	Distribution costs	0.237 (0.041) ^{***}	0.197 (0.050) ^{***}	0.450 (0.108) ^{***}
1994	Income	0.116 (0.008) ^{***}	0.082 (0.008) ^{***}	0.100 (0.011) ^{***}
	Physical distance	0.052 (0.004) ^{***}	0.051 (0.004) ^{***}	0.017 (0.005) ^{***}
	Difficult access	0.436 (0.013) ^{***}		
	Transport infrastructure	0.024 (0.017)	-0.037 (0.019) [*]	-0.051 (0.023) ^{**}
	Freight tariff	0.019 (0.002) ^{***}	0.019 (0.002) ^{***}	0.005 (0.002) ^{**}
	Red Belt	0.018 (0.004) ^{***}	0.021 (0.004) ^{***}	0.028 (0.005) ^{***}
	Price regulations	-0.027 (0.004) ^{***}	-0.025 (0.004) ^{***}	0.000 (0.004)
	Subsidization	0.065 (0.006) ^{***}	0.051 (0.006) ^{***}	0.051 (0.007) ^{***}
	Crime rate	0.167 (0.008) ^{***}	0.151 (0.008) ^{***}	0.103 (0.010) ^{***}
	Economic power of crime	0.062 (0.008) ^{**}	0.065 (0.008) ^{***}	0.041 (0.008) ^{***}
	Distribution costs	0.032 (0.020)	0.162 (0.030) ^{***}	0.264 (0.046) ^{***}
1995	Income	0.157 (0.007) ^{**}	0.136 (0.007) ^{**}	0.199 (0.008) ^{***}
	Physical distance	0.049 (0.003) ^{**}	0.051 (0.003) ^{**}	0.003 (0.003)
	Difficult access	0.245 (0.012) ^{***}		
	Transport infrastructure	0.087 (0.015) ^{***}	0.053 (0.016) ^{***}	0.049 (0.016) ^{***}
	Freight tariff	0.016 (0.002) ^{***}	0.016 (0.002) ^{***}	0.006 (0.002) ^{***}
	Red Belt	0.021 (0.003) ^{***}	0.020 (0.003) ^{***}	0.012 (0.004) ^{***}
	Price regulations	-0.009 (0.003) ^{***}	-0.005 (0.003)	0.023 (0.003) ^{***}
	Subsidization	0.044 (0.005) ^{***}	0.042 (0.005) ^{***}	0.031 (0.006) ^{***}
	Crime rate	0.109 (0.006) ^{**}	0.120 (0.007) ^{**}	0.070 (0.006) ^{***}
	Economic power of crime	0.087 (0.006) ^{**}	0.090 (0.006) ^{**}	0.082 (0.007) ^{***}
	Distribution costs	0.141 (0.032) ^{**}	0.132 (0.036) ^{**}	0.437 (0.057) ^{***}
1996	Income	0.103 (0.008) ^{***}	0.079 (0.008) ^{**}	0.166 (0.008) ^{***}
	Physical distance	0.062 (0.003) ^{**}	0.065 (0.003) ^{**}	0.000 (0.003)
	Difficult access	0.339 (0.013) ^{***}		
	Transport infrastructure	0.059 (0.016) ^{***}	0.009 (0.016)	0.046 (0.014) ^{***}
	Freight tariff	0.008 (0.002) ^{***}	0.008 (0.002) ^{***}	0.005 (0.002) ^{***}
	Red Belt	0.010 (0.004) ^{***}	0.010 (0.004) ^{***}	0.006 (0.003) [*]
	Price regulations	-0.005 (0.004)	-0.002 (0.004)	0.026 (0.003) ^{***}
	Subsidization	0.031 (0.005) ^{***}	0.032 (0.005) ^{***}	0.002 (0.005)
	Crime rate	0.032 (0.005) ^{***}	0.042 (0.005) ^{***}	0.039 (0.004) ^{***}
	Economic power of crime	0.052 (0.007) ^{**}	0.051 (0.007) ^{**}	0.072 (0.007) ^{***}
	Distribution costs	0.181 (0.024) ^{**}	0.178 (0.025) ^{**}	0.411 (0.029) ^{***}

Year	Variable	Russia as a whole	Excluding difficult-to-access regions	European Russia
1997	Income	0.085 (0.007) ^{***}	0.064 (0.007) ^{***}	0.111 (0.006) ^{***}
	Physical distance	0.062 (0.003) ^{***}	0.060 (0.003) ^{***}	0.006 (0.002) ^{***}
	Difficult access	0.331 (0.011) ^{***}		
	Transport infrastructure	0.046 (0.014) ^{***}	0.000 (0.014)	0.036 (0.012) ^{***}
	Freight tariff	0.006 (0.002) ^{***}	0.007 (0.002) ^{***}	0.001 (0.001)
	Red Belt	0.022 (0.003) ^{***}	0.021 (0.003) ^{***}	0.018 (0.003) ^{***}
	Price regulations	-0.010 (0.003) ^{***}	-0.009 (0.003) ^{***}	0.014 (0.002) ^{***}
	Subsidization	0.001 (0.004)	0.001 (0.004)	-0.005 (0.004)
	Crime rate	0.008 (0.006)	0.022 (0.006) ^{***}	-0.023 (0.005) ^{***}
	Economic power of crime	0.033 (0.006) ^{***}	0.034 (0.006) ^{***}	0.025 (0.005) ^{***}
Distribution costs	0.233 (0.019) ^{***}	0.234 (0.020) ^{***}	0.214 (0.023) ^{***}	
1998	Income	0.082 (0.006) ^{***}	0.067 (0.006) ^{***}	0.109 (0.007) ^{***}
	Physical distance	0.039 (0.002) ^{***}	0.038 (0.002) ^{***}	0.006 (0.003) ^{**}
	Difficult access	0.372 (0.010) ^{***}		
	Transport infrastructure	0.003 (0.013)	-0.021 (0.013)	-0.025 (0.015) [*]
	Freight tariff	0.011 (0.002) ^{***}	0.011 (0.002) ^{***}	0.008 (0.002) ^{***}
	Red Belt	0.024 (0.003) ^{***}	0.023 (0.003) ^{***}	0.025 (0.003) ^{***}
	Price regulations	-0.007 (0.003) ^{**}	-0.003 (0.003)	0.015 (0.003) ^{***}
	Subsidization	0.006 (0.004)	0.003 (0.004)	-0.011 (0.006) [*]
	Crime rate	0.010 (0.005) [*]	0.017 (0.006) ^{***}	-0.004 (0.006)
	Economic power of crime	0.034 (0.006) ^{***}	0.035 (0.006) ^{***}	0.029 (0.006) ^{***}
Distribution costs	0.120 (0.018) ^{***}	0.104 (0.020) ^{***}	0.176 (0.029) ^{***}	
1999	Income	0.052 (0.005) ^{***}	0.040 (0.005) ^{***}	0.081 (0.006) ^{***}
	Physical distance	0.020 (0.002) ^{***}	0.019 (0.002) ^{***}	-0.005 (0.003) [*]
	Difficult access	0.290 (0.009) ^{***}		
	Transport infrastructure	-0.062 (0.012) ^{***}	-0.084 (0.012) ^{***}	-0.069 (0.014) ^{***}
	Freight tariff	0.009 (0.002) ^{***}	0.010 (0.002) ^{***}	0.009 (0.002) ^{***}
	Red Belt	0.019 (0.003) ^{***}	0.017 (0.003) ^{***}	0.027 (0.003) ^{***}
	Price regulations	0.002 (0.003)	0.005 (0.003) ^{**}	0.014 (0.003) ^{***}
	Subsidization	0.018 (0.004) ^{***}	0.015 (0.004) ^{***}	0.017 (0.005) ^{***}
	Crime rate	-0.009 (0.004) ^{**}	-0.004 (0.005)	-0.024 (0.005) ^{***}
	Economic power of crime	0.016 (0.005) ^{***}	0.020 (0.005) ^{***}	0.005 (0.006)
Distribution costs	0.104 (0.016) ^{***}	0.107 (0.017) ^{***}	0.149 (0.029) ^{***}	
2000	Income	0.034 (0.005) ^{***}	0.026 (0.005) ^{***}	0.079 (0.005) ^{***}
	Physical distance	0.037 (0.002) ^{***}	0.034 (0.002) ^{***}	0.002 (0.002)
	Difficult access	0.307 (0.009) ^{***}		
	Transport infrastructure	-0.132 (0.012) ^{***}	-0.149 (0.013) ^{***}	-0.135 (0.011) ^{***}
	Freight tariff	0.013 (0.002) ^{***}	0.014 (0.002) ^{***}	0.007 (0.001) ^{***}
	Red Belt	0.023 (0.003) ^{***}	0.022 (0.003) ^{***}	0.025 (0.003) ^{***}
	Price regulations	0.012 (0.003) ^{***}	0.014 (0.003) ^{***}	0.015 (0.003) ^{***}
	Subsidization	-0.003 (0.004)	-0.008 (0.004) [*]	0.009 (0.004) ^{**}
	Crime rate	0.046 (0.005) ^{***}	0.042 (0.005) ^{***}	0.015 (0.004) ^{***}
	Economic power of crime	0.037 (0.005) ^{***}	0.038 (0.005) ^{***}	0.012 (0.005) ^{**}
Distribution costs	0.130 (0.016) ^{***}	0.148 (0.016) ^{***}	0.140 (0.023) ^{***}	

The White heteroscedastic-consistent errors are in parentheses; ^{***}, ^{**}, and ^{*} denote significance at the 1, 5, and 10 percent levels.

Table 4. Contributions to the average price differential by year, percentage

Year	Market friction	to the total price differential			to the price differential less the geographically determined one		
		Russia as a whole	Excluding difficult-to-access regions	European Russia	Russia as a whole	Excluding difficult-to-access regions	European Russia
1992	Unidentified factors	10.0	6.6	-0.5	34.1	24.6	-2.2
	Spatial disconnectedness	70.7	73.4	75.4			
	Shipping conditions	-1.4	-1.0	0.4	-4.8	-3.8	1.5
	Regional protectionism	5.2	5.0	11.2	17.6	18.6	45.7
	Organized crime	15.6	16.1	13.5	53.1	60.6	55.0
	Distribution costs	NA	NA	NA	NA	NA	NA
1993	Unidentified factors	6.1	3.3	0.1	20.0	11.4	0.4
	Spatial disconnectedness	69.7	70.9	70.3			
	Shipping conditions	-0.5	1.0	3.9	-1.7	3.5	13.0
	Regional protectionism	4.5	5.0	13.9	15.0	17.0	46.9
	Organized crime	15.5	17.4	12.4	51.4	59.7	41.8
	Distribution costs	4.6	2.4	-0.6	15.3	8.4	-2.1
1994	Unidentified factors	13.4	9.4	11.6	36.7	24.7	32.2
	Spatial disconnectedness	63.4	62.0	64.0			
	Shipping conditions	2.9	2.7	0.7	8.0	7.2	2.0
	Regional protectionism	4.0	4.8	12.1	10.9	12.6	33.7
	Organized crime	15.4	17.7	11.3	42.0	46.7	31.4
	Distribution costs	0.9	3.4	0.2	2.4	8.9	0.6
1995	Unidentified factors	20.5	17.9	30.1	43.9	37.3	57.6
	Spatial disconnectedness	53.2	51.9	47.8			
	Shipping conditions	4.2	4.1	-0.3	8.9	8.5	-0.6
	Regional protectionism	4.9	6.1	11.5	10.4	12.7	22.0
	Organized crime	13.9	18.0	12.9	29.7	37.4	24.7
	Distribution costs	3.3	2.0	-1.9	7.1	4.1	-3.7
1996	Unidentified factors	12.3	9.7	26.3	42.1	34.6	62.4
	Spatial disconnectedness	70.9	71.9	57.8			
	Shipping conditions	2.9	2.0	-0.1	9.9	7.2	-0.3
	Regional protectionism	2.7	3.9	4.7	9.2	13.7	11.0
	Organized crime	4.7	6.7	9.3	16.1	23.9	21.9
	Distribution costs	6.6	5.8	2.1	22.6	20.6	4.9
1997	Unidentified factors	10.5	8.7	23.2	40.0	34.2	82.9
	Spatial disconnectedness	73.6	74.7	72.0			
	Shipping conditions	2.2	1.4	-1.2	8.2	5.6	-4.3
	Regional protectionism	1.5	2.0	5.9	5.7	7.9	21.1
	Organized crime	2.2	4.0	1.9	8.2	15.8	6.8
	Distribution costs	10.0	9.3	-1.8	38.0	36.6	-6.5
1998	Unidentified factors	11.6	10.7	20.7	49.0	45.0	71.2
	Spatial disconnectedness	76.3	76.2	71.0			
	Shipping conditions	1.7	2.1	1.4	7.3	8.8	4.9
	Regional protectionism	2.8	3.6	6.6	12.0	15.0	22.6
	Organized crime	2.5	3.7	2.6	10.7	15.5	8.8
	Distribution costs	5.0	3.7	-2.2	21.1	15.7	-7.6
1999	Unidentified factors	8.5	7.0	15.6	44.6	37.2	50.2
	Spatial disconnectedness	80.9	81.3	68.9			
	Shipping conditions	-0.3	0.6	2.9	-1.6	3.2	9.3
	Regional protectionism	5.6	6.7	14.4	29.5	35.7	46.5
	Organized crime	0.4	0.8	-0.5	1.9	4.2	-1.8
	Distribution costs	4.9	3.7	-1.3	25.5	19.8	-4.3
2000	Unidentified factors	5.6	4.6	18.7	26.2	19.4	47.4
	Spatial disconnectedness	78.8	76.2	60.5			
	Shipping conditions	-1.0	1.0	7.0	-4.5	4.4	17.8
	Regional protectionism	4.7	5.4	12.8	22.1	22.5	32.5
	Organized crime	5.6	6.9	2.1	26.6	29.2	5.2
	Distribution costs	6.3	5.8	-1.2	29.7	24.5	-2.9

Table 5. Panel estimates over 1993-2000

Variable	Russia as a whole	Excluding difficult-to-access regions	European Russia
Income	0.100 (0.000) ^{***}	0.076 (0.003) ^{***}	0.094 (0.003) ^{***}
Physical distance	0.015 (0.005) ^{***}	0.015 (0.000) ^{***}	0.012 (0.000) ^{***}
Difficult access	0.368 (0.005) ^{***}		
Transport infrastructure	0.029 (0.006) ^{***}	-0.005 (0.006)	-0.059 (0.007) ^{***}
Freight tariff	0.016 (0.001) ^{***}	0.017 (0.001) ^{***}	0.008 (0.001) ^{***}
Red Belt	0.014 (0.001) ^{***}	0.014 (0.001) ^{***}	0.023 (0.002) ^{***}
Price regulations	-0.012 (0.001) ^{***}	-0.008 (0.001) ^{***}	0.017 (0.001) ^{***}
Subsidization	0.017 (0.002) ^{***}	0.012 (0.002) ^{***}	0.013 (0.002) ^{***}
Crime rate	0.078 (0.003) ^{***}	0.077 (0.003) ^{***}	0.033 (0.003) ^{***}
Economic power of crime	0.047 (0.003) ^{***}	0.049 (0.003) ^{***}	0.042 (0.003) ^{***}
Distribution costs	0.093 (0.009) ^{***}	0.115 (0.010) ^{***}	0.228 (0.015) ^{***}

Panel-corrected standard errors are in parentheses; ^{***}, ^{**}, and ^{*} denote significance at the 1, 5, and 10 percent levels.

Table 6. Contributions to the average price differential, 1993-2000, percentage

Market friction	to the total price differential			to the price differential less the geographically determined one		
	Russia as a whole	Excluding difficult-to-access regions	European Russia	Russia as a whole	Excluding difficult-to-access regions	European Russia
Unidentified factors	12.7	9.8	14.0	44.4	34.7	47.1
Physical distance	52.7	71.7	70.3			
Difficult access	18.7					
Transport infrastructure	0.7	-0.1	1.5	2.5	-0.4	5.1
Freight tariff	2.1	3.2	0.4	7.4	11.4	1.5
Red Belt	1.5	1.9	5.4	5.3	6.6	18.2
Price regulations	-0.9	-0.6	2.2	-3.1	-2.2	7.5
Subsidization	1.1	1.1	1.9	4.0	3.9	6.6
Crime rate	6.2	7.9	2.8	21.6	27.9	9.3
Economic power of crime	2.0	2.1	2.4	7.0	7.6	7.9
Distribution costs	3.2	3.0	-0.9	11.0	10.7	-3.1

Table 7. Panel estimates excluding Moscow over 1993-2000

Variable	Russia as a whole	Excluding difficult-to-access regions	European Russia
Income	0.070 (0.003) ^{***}	0.042 (0.003) ^{***}	0.058 (0.004) ^{***}
Physical distance	0.014 (0.000) ^{***}	0.015 (0.000) ^{***}	0.012 (0.000) ^{***}
Difficult access	0.383 (0.005) ^{***}		
Transport infrastructure	0.109 (0.006) ^{***}	0.077 (0.006) ^{***}	-0.007 (0.007)
Freight tariff	0.014 (0.001) ^{***}	0.015 (0.001) ^{***}	0.006 (0.001) ^{***}
Red Belt	0.014 (0.001) ^{***}	0.015 (0.001) ^{***}	0.022 (0.002) ^{***}
Price regulations	-0.015 (0.001) ^{***}	-0.010 (0.001) ^{***}	0.015 (0.001) ^{***}
Subsidization	0.009 (0.002) ^{***}	0.004 (0.002) ^{***}	0.009 (0.002) ^{***}
Crime rate	0.095 (0.003) ^{***}	0.098 (0.003) ^{***}	0.051 (0.003) ^{***}
Economic power of crime	0.067 (0.003) ^{***}	0.071 (0.003) ^{***}	0.053 (0.003) ^{***}
Distribution costs	0.090 (0.009) ^{***}	0.103 (0.010) ^{***}	0.205 (0.015) ^{***}

Panel-corrected standard errors are in parentheses; ^{***}, ^{**}, and ^{*} denote significance at the 1, 5, and 10 percent levels.

Table 8. Contributions to the average price differential excluding Moscow, 1993-2000, percentage

Market friction	to the total price differential			to the price differential less the geographically determined one		
	Russia as a whole	Excluding	European Russia	Russia as a whole	Excluding	European Russia
		difficult-to-access regions			difficult-to-access regions	
Unidentified factors	8.0	4.7	6.3	27.6	15.7	25.6
Physical distance	51.0	70.3	75.4			
Difficult access	19.9					
Transport infrastructure	3.5	2.7	0.0	12.1	9.0	0.1
Freight tariff	1.8	2.8	0.3	6.2	9.5	1.1
Red Belt	1.5	1.9	5.4	5.2	6.3	22.1
Price regulations	-1.1	-0.7	1.9	-3.6	-2.4	7.7
Subsidization	0.7	0.4	1.4	2.3	1.3	5.7
Crime rate	8.3	11.4	5.8	28.6	38.6	23.7
Economic power of crime	3.1	3.5	3.7	10.6	11.7	14.9
Distribution costs	3.2	3.0	-0.2	11.0	10.2	-0.8

Figure 1. Structure of price differential less its geographically determined part

