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Common Russian Market
Myth rather than Reality

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This paper presents a theoretical argument that the relationship between price differences and per capita demand differences (approximated by per capita income differences) across locations can be used as a cross-sectional test of the law of one price. Since the relationship should be statistically insignificant or very weak in an integrated economy, its strength can measure the extent of market integration. Using this approach, the temporal pattern of Russia's internal market integration is characterized. The data used span 1992 – 1999, and cover most regions of the country; a number of consumer goods and aggregates are included in the analysis. The price-income relationship is found to be strong over the whole time span considered, thus indicating that the Russian market is not near to being integrated even in the present day. Nevertheless, integration tends to improve over time, though there are deviations from this tendency in 1997 and 1999. A number of culprits behind market fragmentation are identified, organized crime among them.

Keywords: Russia, law of one price, market integration, price dispersion, Russian regions.

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NON-TECHNICAL SUMMARY

In Russian economic and related literature, much ink is being spilled over the "single economic space." Although a different meaning is read into the notion of single economic space, it is believed that everybody would agree that the notion should, at least, imply the absence of artificial impediments to inter-regional trade, or, in other words, it should imply integration of the Russian market. If so, differences in commodity prices between regions should be dictated only by transportation costs, that is, the law of one price must hold. Indeed, some studies have found inter-regional price gaps caused by the 1992 liberalization shock to be diminishing with time. But along with this, there are various reasons for doubting that the Russian economic space has really become "single." The pattern of inter-regional price dispersion more closely resembles that of an international economic union rather than that of a single country.

Therefore a number of questions arise. Has the Russian consumer market become integrated? If this is not the case, then what is its developmental tendency, that is, is it moving towards integration, or is it becoming more regionally fragmented? And what impedes market integration? These are the questions that this paper attempts to answer.

As it follows from the law of one price, in an integrated market economy, the price for a good in some region cannot depend on the demand in this region, since a rise in the price caused by an increase of the quantity demanded would be immediately forced down by an inflow of the good from other regions where its price is lower. Properly speaking, this indicates that the market of a country is single; otherwise, it is nothing more than a collection of loosely bounded regional markets. Hence, taking into account transportation costs and distribution costs (which are region-specific, in particular, dependent on wages in retail trade), there should not be a relationship between the dispersion of prices and demand among regions of the country. If a relationship exists, this suggests that the market is not integrated. Thus, the strength of the relationship can measure the extent of integration: the stronger the relationship, the weaker integration.

Based on this theoretical ground, a statistical analysis of price dispersion among 74 Russian regions is performed. Regional per capita income is used as a proxy of demand, and the distance between the capital cities of the regions is used as a proxy of transportation costs. Statistical estimations are carried out for each year of the period 1992 – 1999, thus providing an evolving pattern of changes in integration.

The analysis reveals a rather strong relationship between the differences in prices and incomes during the entire time span considered. If the regions with difficult access (such as Yakutia, Kamchatka, *etc.*) are eliminated, the relationship weakens but still remains significant. The market of European Russia (without its northern regions) would be expected to be much more integrated, since the distances between regions are relatively short here, and the transportation infrastructure is far better developed. Surprisingly, it turns out that this is not the case. In general, the pattern provides evidence of poor integration of the consumer market of the country; it is premature to speak of the Russian economic space as being "single."

However, there are encouraging features in the pattern as well. Fragmentation of the market was increasing until the end of 1994, and then it has been permanently decreasing, excluding 1997 and 1999. It can be argued that since about 1994 – 1995, the integration of the internal market of Russia tends, in general, to be improving.

Reasons for poor market integration are rather numerous, among them regional protectionism, the lack of information on trade opportunities, organized crime, *etc.* To evaluate their importance, the analysis has been augmented to include those of them that are quantifiable. They are the quality of the transportation infrastructure, intra-regional transport costs, subsidies, price regulations (for foods), "shuttle trade" (for industrial goods), and organized crime.

A positive relationship between price dispersion and the difference in the quality of the infrastructure takes place for the most part only when the difficult-to-access regions are involved in the analysis, and a positive relationship between differences in prices and intra-regional transportation costs is found when these regions are, vice versa, eliminated. What is unexpected is that the relationship between state intervention in the regional economy — subsidies and price regulations — and price dispersion turns out to be mostly negative. That is, under contemporary Russian conditions, state intervention in the economy facilitates (on average) the narrowing of inter-regional price gaps. At the same time, "shuttle trade," quite to the contrary, widens them. At last, organized crime sufficiently impedes market integration, widening price dispersion. Although, the impact of this factor is weakening with time, the effect of organized crime peaked about 1993 – 1995.

The results obtained provide hope that the Russian internal market is moving towards integration. Unfortunately, the movement is slow and not steady. There are serious artificial barriers to inter-regional trade, and special efforts are needed to remove them.

1. INTRODUCTION

As market institutions are developing in Russia, one might expect that price divergence across regions of the country (which has been caused by the price liberalization of 1992) should give place to the convergence of prices. Indeed, some studies (see below) have found that price differences across Russian regions are diminishing over time.

But, on the other hand, there is abundant evidence that the "single economic space" — much ink has been spilling over which — is as yet a kind of poetical metaphor rather than reality. For example, in December 1999, the cost of the basket of 25 basic food goods varied 1.7-fold across the regions of European Russia (without its northern territories): from 76% of the Russian average in the Ulyanovsk Oblast to 132% in Moscow. Spatial consumer price indices calculated by Surinov (1999) show that the dispersion range of the food price level across these regions was equal to 32% in January 1998 (Moscow vs. the Kaliningrad Oblast), and that of the industrial goods level was 62% (with the Smolensk Oblast and the Stavropol Krai as the low and high ends, respectively). This more closely resembles the pattern of an international economic union (*e.g.*, Morgan, 1998 estimates food price differences across the Euro-zone as ranging up to 1.43) than the pattern of a single country.

Therefore a number of questions arise. Has the Russian consumer market become integrated? If not so, then what is its developmental tendency, that is, is it moving towards integration, or is its regional fragmentation increasing?

The conventional approach of the law of one price testing with the use of cointegration analysis can answer the first question, but it is impotent in solving the second. The point is that the cointegration regressions provide an estimate which averages (in some sense) price behavior over the entire time span considered, and so, fundamentally they are not able to capture changes in the nature of the behavior during this span. But it is just in a transitional economy where such changes are to be expected.

To face this problem, this paper puts forward a cross-sectional test of the law of one price. The test consists of the estimation of a relationship between price differences and demand differences — approximated by income-per-capita differences — across Russian regions at a given point in time. As it follows from the law of one price, this relationship should be statistically insignificant (or, at least, very weak) in an integrated market economy. Therefore, the strength of the relationship can be used to

measure the degree of integration of a market. The temporal pattern is provided by a sequence of cross-sectional estimations for a number of points in time; and so, the analysis could be labeled as "quasidynamic."

For the statistical analysis, price data (prices of a number of aggregated and individual consumer goods) with annual frequency are used. The time span covered is 1992 through 1999; the cross-sectional samples involve most (74 of the 89) regions of Russia.

The results obtained suggest that the Russian consumer market is far from being integrated up to the present. The relationship between price and income differences is found to be strong in many cases over the whole time span considered, thus indicating sufficient barriers to interregional trade. However, market fragmentation tends to diminish with time. Generally, the relationship grows weaker over the years. Organized crime is found to be one of the culprits behind the regional fragmentation of the Russian market.

This study relates to a number of papers devoted to market integration in modern Russia. Gardner and Brooks (1994) as well as De Masi and Koen (1995) examined the early stage of the transition. They found large price differences across locations that could not be assigned to transportation costs. At the same time, some indications were obtained that these differences tended to decrease. More recently, Koen and De Masi (1997) stated that price convergence across regions within a country over time is one of the stylized facts and achievements observed in most transition economies. Focusing on the comparison of state and market prices, Berkowitz *et al*. (1998) have concluded that there is a linkage between price behavior across Russian cities. With the use of a relationship between price dispersion and distances, Berkowitz and DeJong (1999) have found that there is a cluster of regions, the so-called Red Belt, which accounts for a significant share of the market fragmentation; controlling for this, the Russian economy operates in some sense like a market economy.

Recently, Berkowitz and DeJong (2001) have studied temporal changes in market integration in Russia, having based their study, again, on the relationship mentioned. (The relation between the results of the current study and those of Berkowitz and DeJong is discussed in Section 4.2). Gluschenko (2001a) has tested the law of one price across West-Siberian regions over 1992 – 1998 with the use of cointegration techniques. The pattern obtained has been mixed; both convergence and divergence of prices take place in this part of the Russian internal market.

The study also relates to empirical works examining the issue of the law of one price in market economies, in particular, Parsley and Wei (1996), Engel and Rogers (1996), Obstfeld and Taylor (1997).

De Masi and Koen (1995) seem to be the first who noticed the relationship between per capita incomes in regions and regional price levels in Russia. However, they did not go into deeper analysis of this. Using 1995 prices of 10 food goods, Zarova and Prozhivina (1997) sought factors determining the price level in a region. Among these, they found, like De Masi and Koen before, a positive relationship between prices and average per capita income. But since their study totally ignores inter-regional trade, the authors regarded the effect quite in order, and thus needing no additional analysis or explanation.

However, neither theoretical nor empirical papers have been found that relate closely to the approach adopted in this study, and at the same time that concern a country with an *advanced market economy*, *i.e.*, that provide an analysis of the relationship between price dispersion and demand (income) differences within such an economy. (Although, one subplot in article by Engel and Rogers (1996) can be interpreted as relevant; see Section 4.2.) It is very likely that the lack of such a relationship seems to be so obvious that no economists have attended to its theoretical substantiation and empirical testing. This is cause for regret since a comparison of the findings of this study with some relevant results for a country with an advanced market economy (*e.g.*, USA) would be very desirable in order to judge the extent to which the behavior of the Russian economy deviates from the behavior of an economy believed to be integrated.

The paper is organized as follows. In the next section, the theoretical grounding for a cross-sectional test of the law of one price is provided. In Section 3, the econometric model and data used for the analysis are described. Empirical results are reported in Section 4, and Section 5 is concerned with impediments to market integration, providing both a discussion of additional variables and relevant empirical results. Conclusions are drawn in Section 6. For technical reasons, Appendices E, F, and G are not included in the printed version of the paper. They can be found on the EERC web site (www.eerc.ru).

2. THEORETICAL GROUND

2.1. A Cross-Sectional Test of the Law of One Price

As it immediately follows from the law of one price, in a perfectly integrated economy there should not be a persistent relationship between the differences in prices of tradable goods and demand differences

across locations. Demand shock in a given location provokes a local rise in prices, but this, in turn, causes an increase in supply due to inter-location commodity arbitrage, thus reducing the prices here; contemporaneously, arbitrage increases prices in locations where they are lower.

Let us consider a world with a perfectly integrated economy; by such is meant an economy in which there are not any economic, physical, and administrative obstacles to the movement of goods between any locations. The absence of economic obstacles implies, among other things, that arbitrage is costless. The usual assumption of instantaneous arbitrage applies as well. Clearly, in such an ideal economy, the law of one price holds at every instant since any infinitesimal deviation from the equilibrium will be instantly eliminated by perfect arbitrage. Therefore the perfectly integrated economy may be considered as an economy in which the law of one price holds.

For the convenience of subsequent formalization, let us simplify our world further. Let it consist of only two locations, r and s, and there is only one good, the prices of which in these locations are denoted as P_r and P_s. Both the markets are perfectly competitive. It is also supposed that any possible demand as well as supply provided by local producers are negligibly smaller in location r than those quantities in location s. The interpretation is that r is some city or relatively small region of a country, and s is the rest of this country. Arbitrage transaction costs per unit of good (marginal costs of arbitrage) are denoted as C_{rs}; since arbitrage is perfect: $C_{rs} = 0$. Income per capita, I_r, will be considered as the only factor, besides price, determining demand in location r, so that $Q_r^D = D(P_r, I_r)$; $D(\cdot,\cdot)$ monotonically decreases in price, and monotonically increases in income.

With these assumptions, supply in r will be absolutely elastic as any increase in demand in r will be opposed by an instant inflow of good from s, and a decrease will cause an instant outflow to s; thus the price in r is permanently maintained to be on the level $P_r = P_s$ (price P_s can be considered as constant without any loss of generality; in fact, a change in P_s means a change in the overall price level in the country, and to eliminate this, it is sufficient to take P_s as a numeraire). Fig. 1 illustrates different equilibria in submarket r of a perfectly integrated market (S labeling the supply curve).

As the figure clearly demonstrates, with perfect arbitrage the same price P_s corresponds to each demand (hence, to income, I_r). Thus, the absence of the dependence of local prices on local demand (income) is a *necessary* condition for the law of one price to hold (the same, though, is valid for any other variable since the law is strictly formulated as

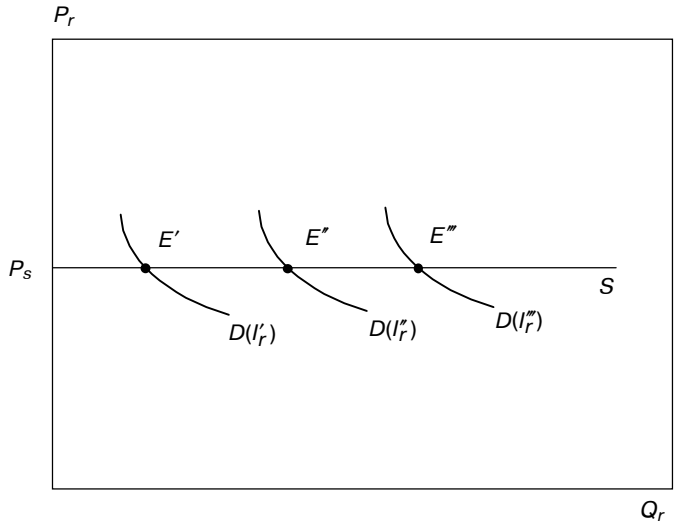

Fig. 1. Market equilibria in a local market with perfect arbitrage.

$P_r = P_s$). Hence, any relationship between the relative price and demand (income) in location r points to a violation of the law of one price, so indicating that there are some barriers in the way of commodity flows between r and s, and thus that the economy is not integrated.

At this point, let us allow for such barriers. Barriers are considered as fully characterized by arbitrage transaction costs $C_{rs} > 0$ (this does not decrease the generality as well, since with a broader notion of transaction costs, these may also involve barriers of an non-economic nature, *e.g.*, administrative ones). In such an economy, arbitrage is no longer able to equalize prices in r and s as arbitrage occurs only if the price difference exceeds costs C_{rs}, otherwise arbitrage turns out to be unprofitable. Fig. 2 illustrates the situation (S_L labels the supply curve of producers located in r).

As soon as demand becomes such that local producers would supply the good at a price exceeding $P_s + C_{rs}$, deliveries from s become profitable, thus beating the price back down to $P_s + C_{rs}$. Therefore total supply turns out to be absolutely elastic in the section $Q_r \geq Q_+$. When demand falls to a quantity such that the good will have to be sold at a price below $P_s - C_{rs}$, the price fixes itself at the level $P_s - C_{rs}$, since all quantities that do not meet demand at this price can be exported to s, and be sold at price P_s, losing C_{rs} per unit of quantity. Thus, supply is absolutely

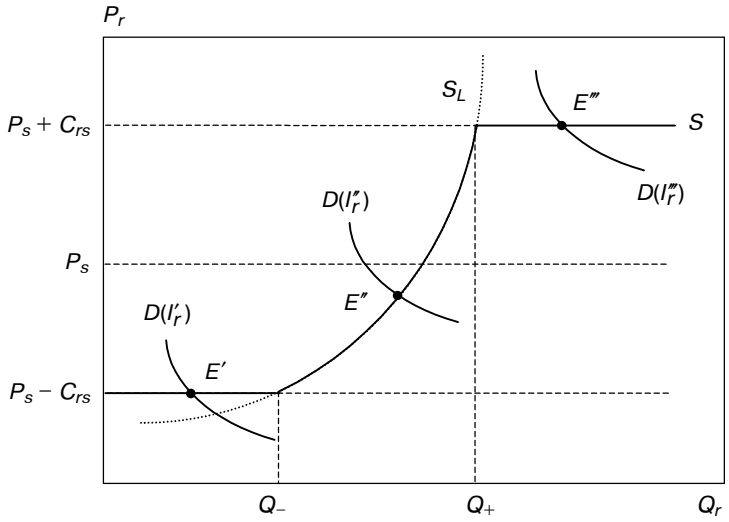

Fig. 2. Market equilibria in a local market with imperfect arbitrage ($C_{rs} > 0$).

elastic in the section $Q_r \le Q_-$ as well. If demand is such that the equilibrium price is confined between these bounds, $P_r \in [P_s - C_{rs}, P_s + C_{rs}]$, then both imports and exports are unprofitable. In this case, local producers supply the entire demand, and their entire output is sold in the local market, the total supply coinciding with curve S_L on segment $[Q_-, Q_+]$. Thus, a persistent difference in prices P_r and P_s appears (of course, if prices do not accidentally coincide). The price of the good in r now turns out to be dependent on demand, and hence, on income, $P_r = f(Q_r(I_r))$; the equality $P_r = P_s$ that represents the law of one price is substituted with inequality $P_s - C_{rs} \le P_r \le P_s + C_{rs}$.

It is possible that a change in personal income in locality r affects not only the demand side, but the supply side as well. For example, a rise in personal income can be due to an increase in wages, and hence in production costs. On the other hand, rising income could push up individuals' demand for land, so heightening their competition with producers in the land market. As a consequence of this, marginal production costs will grow, and the supply curve of local producers will change. The result will be a decrease in Q_- and Q_+ (maybe, different) and a change in the supply curve's shape in segment $[Q_-, Q_+]$. However, as it is easy to see from Fig. 2, this does not affect at all the conclusions drawn. (We could even restrict our consideration to the short run in which the local supply

is absolutely inelastic. Then S becomes a staircase function; nevertheless, all conclusions still hold.)

Let us now start moving from our ideal world (even with its market frictions) to the real one. To begin with, let us leave out the assumption of instantaneous arbitrage. When arbitrage takes finite time, price shocks will no longer be extinguished instantaneously and transient deviations of price P_r from equilibrium value P_s become possible. Then the law of one price should hold statistically; this can be represented, *e.g.*, as

$$\ln(P_{rt}/P_{st}) = \varepsilon_{rst} \quad (t = 1, \ldots, T), \tag{1}$$

where t indexes time, and ε_{rst} is a random value with zero mean and finite variance. Taking into account the potential possibility of impediments to arbitrage, it is reasonable to insert these into (1), thus obtaining

$$\ln(P_{rt}/P_{st}) = g(I_{rt}) + \varepsilon_{rst} \quad (t = 1, \ldots, T), \tag{2}$$

where $g(\cdot)$ is the relevantly transformed function $f(\cdot)$; the function is assumed to be the same at each t. The law of one price holds if (2) coincides with (1), that is, if $g(I_{rt}) \equiv 0$ (with the above-mentioned properties of the equilibrium error ε_{rst}). In statistical terms, this means that the estimate of $g(I_{rt})$ is insignificant.

Let us recall now that s is the entire country without r rather than a monolithic "locality." Therefore we can isolate any one of this country's locations as r; all the aforesaid holds for it provided that the condition of "smallness" is met. Model (1) is valid for any location r at any time. Therefore, once there is a set of various locations $\{r\}$, instead of a temporal sample, a cross-sectional sample can be used for some fixed point of time. Assuming $g(\cdot)$ to be uniform for all locations, model (2) can be rearranged to

$$\ln(P_r/P_s) = g(I_r) + \varepsilon_{rs} \quad (r = 1, \ldots, R). \tag{3}$$

Let us take two such locations, r_1 and r_2. Since expression (3) is valid for each location, an analogous relation will connect them to one another. The relation can be obtained formally by subtracting Equation (3) for r_1 and r_2 from one another; P_s disappears with this. The difference is that the function on the right-hand side becomes bivariate. For convenience, let us transform it into a univariate function $h(\cdot)$, taking the ratio of incomes in r_1 and r_2 as the argument. The uniformity of $h(\cdot)$ for any pair of locations is also assumed. In order not to complicate the notation, the previous indexing of locations by r and s is restored. Clearly the meaning of s changes with this; submarket s now becomes

interchangeable with submarket r.[1] Model (3) for locality pairs takes the form

$$\ln(P_r/P_s) = h(I_r/I_s) + \varepsilon_{rs} \quad (r, s \in \{(r, s) \mid r \neq s\}). \tag{4}$$

This model (as well as (3)) is a tool for the cross-sectional test of the law of one price. If estimation of $h(\cdot)$ is statistically insignificant, *i.e.*, $h(I_r/I_s) \equiv 0$, the law may be believed to hold (with some reservations which will be stated below). The other case, when the relationship between price difference and income (demand) difference is detected, suggests the failure of the law.

Unlike usual cointegration tests, which merely indicate whether the law of one price holds or does not, the cross-sectional test provides the "degree" of failure of the law. Statistical estimation of model (4) eventually comes to the calculation of a linear parameter of a specific function, *i.e.*, $h(\cdot)$ is represented as $\beta H(\cdot)$, where $H(\cdot)$ is a known function, and the value of β is determined. If an economy is integrated, then $\beta = 0$. If it is not, the preceding analysis suggests that $\beta > 0$. Therefore, the strength of the relationship between prices and incomes, β, can measure the integration of the market, that is, the stronger the relationship, the weaker the integration. A set of estimates of β for successive points of time yields an evolving pattern of market integration, thus providing insight into its evolution.

The situation when the price is within the "arbitrage inaction band" (named so by Obstfeld and Taylor, 1997), $[P_s - C_{rs}, P_s + C_{rs}]$, means autarky, full closeness of market r. Such situations are not frequent in reality; more likely one may expect the equilibrium point to fall on either the left or right horizontal section of the supply curve (see Fig. 2). In a location pair, the first case should occur in a "poorer" location and the second case will be in a "richer" one (for comparability, both supply and demand can be considered as per capita values). Then, in fact, dependence of price dispersion on arbitrage transaction costs, C_{rs}, rather than on income dispersion takes place. However, since these costs are unobservable, it is just the dependence on income that will be seen; namely, if a location is "richer," then the price is higher there. But if we can quantify some components of arbitrage transaction costs, then this dependence should weaken as the components are inserted in the model, and it should disappear when the whole magnitude of these costs

[1] The former "rest of the country," though behind the scenes, does implicitly act, providing the horizontality of supply curves in both locations either along the whole length of the curves (when $C_{rs} = 0$) or in the sections of profitability of arbitrage.

(*i.e.*, all their components) is included. This is a rather important consideration.

Perfectly integrated economies do not exist, since every spatially dispersed market is segmented by physical distance. Due to this, arbitrage transaction costs will always be nonzero because of the costs of shipping goods. Then the question arises: what is a *realistic* integrated economy? It seems that an economy in which there are no "artificial" barriers to inter-locality trade, or at worst in which these barriers are very low, can be accepted as integrated. This means that if model (4) or (3) is augmented for transportation costs (commonly approximated by distances), then the dependence of price differences on income differences should turn out to be insignificant — or, at least, very weak — in such an economy. In other words, the economy is deemed to be (realistically) integrated if the law of one price holds except for transportation costs.

Further step on the road to the real world includes the abandonment of the assumption that there is the only good. With several goods, demand turns out to be ambiguously related to income if for no other reason than the substitution effect. Taking into account non-tradables complicates the issue still more. For example, a rise in the price for services, which takes the lead over income growth, can reduce the demand for goods, and we will observe that prices for goods decrease while incomes increase.[2] Therefore it would be better to deal with the dependence of prices not on incomes, but directly on demand. However this way is unrealistic since direct demand indicators (as, *e.g.*, sales quantities) are unavailable. For this reason, per capita incomes nevertheless will be used to characterize demand, bearing in mind that this is nothing more than *a proxy* of demand for a good.

As indicated earlier, the absence of the dependence of local prices on local demand (income) is a necessary condition for the law of one price to hold. Why is this not a sufficient condition as well? The point is that spatial price differences are not always determined by income differences. Let, *e.g.*, a good not be produced in locality r at all, but be entirely delivered from another part of the country, s. Then supply in r will be absolutely elastic, as in Fig. 1, but nevertheless prices in r and s can be different. This occurs when the supply curve is shifted upward from price P_s. One portion of shift owes to costs of transportation from s to r, this part is to be eliminated by the above-accepted convention. But different parts may take place, *e.g.*, local sale tax.

[2] Such a situation is rather probable in Russia because of sharp leaps in tariffs for housing and utilities, prices for electricity, urban transportation fares, *etc.*, which occur asynchronously in various regions of the country.

Spatial price differentiation, which is not related to local incomes, may also take place during periods of high and unpredictable inflation, rendering rational expectations impossible. One more reason is the low intensity or lack of arbitrage activity that is peculiar to the beginning of transition when market institutions were still being formed. Hence, the cross-sectional test of the law of one price is to some degree "one-sided." A negative result of the test guarantees the failure of the law while a positive one does not provide full confidence that the law holds. Therefore inference that a market is integrated drawn from the statistical insignificance of β is conventional to some extent. In other words, a market is deemed to be integrated in the sense of the adopted measure of integration.

2.2. The Problem of Non-tradable Inputs

The dependence of local prices on local incomes superficially resembles the Balassa – Samuelson effect. The effect is that rich countries tend to have higher price levels than poor ones. However, the Balassa – Samuelson effect fundamentally relates to *overall price level* which involves prices for services (it is the contribution of more expensive services to this level in rich countries that causes the effect), and so, seemingly it is unrelated to the prices of tradable goods. Nevertheless, a linkage does exist, since goods considered as tradables contain, in fact, a non-tradable component, namely, distribution and marketing services (see, *e.g.*, Rogoff, 1996; Engel and Rogers, 1995, 1996; *etc.*). The difference in the prices of non-traded inputs between two locations would give rise to a deviation from the law of one price, even if wholesale prices of the good were equal in these locations.

To exemplify this, Appendix A provides the structure of the retail trading costs in Russia for 1993 – 1998. From these data, it is seen that most of the cost components should have location-specific prices (local shipping, electricity, labor, *etc.*). Besides that, distribution services are highly labor-intensive; direct remuneration of labor (including wage taxes) alone comprises about half of the retail trading costs. Therefore, the contribution of the non-traded component to retail prices is likely to be higher in richer locations (due to more expensive labor input), so causing an effect similar to the Balassa – Samuelson effect.

The prices of some other inputs may be dependent on local incomes as well, *e.g.*, rents (although in Russia they hardly play a noticeable role, comprising, on the average, about 1% of the final prices of goods; see Appendix A). Owing to this, even though a product market is perfectly integrated and there are no transportation costs, price dispersion across

locations would still be observed. To put it differently, the price differential term in (3) and (4) may pick up, in parallel with the local demand effects, variations in marketing cost as well.

There are two possible ways to deal with this problem. The first is to interpret the difference in distribution costs as an indication of imperfect integration. In fact, this means that the notion of market integration is widened. That is, β will measure not only the integration of the goods market as such, but also the integration of the market for non-traded distribution services and of the labor market. Such a generalization is quite meaningful, since marketing costs may not all be locality-specific. For example, this is the case when there are nation-wide and/or multi-region-wide department store chains and corporations' distribution networks, which is typical for counties with advanced market economies, but is almost totally non-existent in contemporary Russia. Wide inter-regional wage variations in the Russian trade sector mostly arise from the high level of fragmentation of the labor market (the housing problem being the key reason for the low geographical mobility of labor).

The benefits of this approach are a more comprehensive pattern of the spatial price behavior in transition (though at the expense of going beyond the traditional interpretation of market integration), and less severe demands on needed data; in particular, it is possible to dispense with data on distribution costs. The disadvantage is that the value of β by itself may tell us little about how well the market is integrated. The point is that even in an advanced market economy, both the market for distribution services and the labor market can not be fully integrated, hence, it is not improbable that a relationship between the retail price differential and income differential exists in such economies. If so, β should be related to a certain reference point β_{min}, which is the magnitude of β for an economy thought of as being integrated. The value β_{min} represents the (practicable) lower boundary of integration imperfection (bearing in mind the widened notion of market integration).

The second way is to explicitly take into account differences in distribution costs or to eliminate them. In the former case, the right-hand side of (4) should be supplemented with variables representing trading costs (or their key components, *e.g.*, local shipping tariffs, prices for electricity, rents, and — primarily — wages in retail trade[3]) or the retail-wholesale margin. In the latter case, prices on the left-hand side should be cleared

[3] However, just inserting the wage variable leads to difficulties since wages could be (and actually are) highly correlated with incomes, thus causing the multicollinearity problem.

from distribution costs, *i.e.*, price P_r is replaced by

$$P_r' = P_r(1 - c_r), \tag{5}$$

where c_r is the percent contribution of distribution costs to retail sales in region r in a given year. Another method would be to use wholesale prices, but data on these prices are hardly available, as the Russian sta tistical agency does not collect data on the wholesale prices of consumer goods intended for retail trade in various locations. And so, retail prices cleared from the wholesale-retail margin are to be used as a proxy of wholesale prices, that is,

$$P_r'' = P_r(1 - m_r), \tag{6}$$

m_r being the retail-wholesale margin rated on a percentage basis to retail sales in region r in a given year.

The disadvantage of this way is that available data on the costs and the margins are aggregated over the entire retail trade sector; hence, these data are but a rough index of the distribution costs in the price of a specific goods basket or, all the more, an individual good. So, transformation (6) can be very arbitrarily deemed as being a conversion of a retail price into the "wholesale" one. Of course, this is not an actual wholesale price, since the margin varies across goods, while m_r is averaged over all goods sold for a year.

3. ECONOMETRIC METHODOLOGY AND DATA

3.1. Econometrics

The basic specification of the model being used for the analysis is

$$P_{rsit} = \beta_{it} I_{rst} + (\alpha_{it} + \gamma_{it} L_{rs}) S_{rsit} + \varepsilon_{rsit} \qquad (r,s) \in \Pi \subset \{1, \ldots, N\}^2, \tag{7}$$

for each unequal r and s from $\{1, \ldots, N\}$, the set Π contains exactly one of the pairs (r, s) and (s, r). The following designations are used: r (as well as s) indexes regions; N is the number of regions; $P_{rsit} = \ln(P_{rit}/P_{sit})$ is the price differential, P_{rit} is the price of good/basket of goods/composite good i in region r at time t; $I_{rst} = \ln(I_{rt}/I_{st})$ is the income differential, I_{rt} is the per capita income in region r at time t; $L_{rs} = \ln D_{rs}$, D_{rs} is the distance between the capital cities of regions r and s; $S_{rsit} = \mathrm{sgn}(P_{rsit})$ if $P_{rsit} \neq 0$, and $S_{rsit} = 1$ if $P_{rsit} = 0$; ε_{rsit} is the error term. Coefficient β_{it}, which is to be estimated, measures the strength

of linkage between the price differential and income differential at time t in submarket i (market of the good i). It is expected to be positive or zero (statistically insignificant) if the market is integrated. The sign of the coefficient on distance, γ_{it}, is expected to be positive.

The fact that S_{rsit} is a function of the exogenous variable may lead one to suspect endogeneity in (7). However, this is not the case here. Information inherent in an observation for a region pair (r, s) is identical with that in an observation for the pair (s, r). Therefore each of the possible $2^{N(N-1)/2}$ sets Π (which vary only in the order of regions in pairs) contains the same information. Hence, estimates of (7) must be invariant with the choice of Π. Let us take a sample $\{y_i, \mathbf{X}_i\}$, over which a linear regression is estimated. It is known that multiplying both sides of the regression by -1 for any observation k leaves the estimates and statistical inference unaffected. Replacement of a pair (r, s) by (s, r) in Π is equivalent to such an operation as $P_{rsit} \equiv -P_{srit}$ by construction. The sign of I_{rst} (as well as the signs of other variables augmenting the model; see Sections 4 and 5) also changes automatically with the interchange of r and s; however the intercept and L_{rs} (as $L_{rs} \equiv L_{sr}$) have to be explicitly multiplied by -1. But, since all the sets Π are formally peer entities, extra considerations are needed to answer the question of what sign of the intercept and L_{rs} should correspond to the pair (r, s), and what to the pair (r, s) (in distinction to the hypothetic regression where we have the starting sample with the given signs of regressors). Economic intuition provides these considerations, suggesting that the rise in distance between r and s will cause the *absolute* value of the price differential, $|P_{rsit}|$, to increase. That is, positive P_{rsit} must increase by L_{rs}, and negative P_{rsit} must decrease by L_{rs}, *i.e.*, increase by $-L_{rs}$. On this ground, the set $\Pi_+ = \{(r, s)|P_{rsit} \geq 0\}$ is taken as the "starting" one, L_{rs} having its "inherent" sign ($L_{rs} = \ln D_{rs}$) and the intercept is taken to be $+1$ in relevant observations. The signs of these regressors alternate when the order of regions in the pair turns out to be reverse as compared with the pair belonging to Π_+. For an arbitrary Π, this is formalized by representing the intercept as $1 \times S_{rsit}$, and the distance variable as $L_{rs} \times S_{rsit}$, where $S_{rsit} = 1$ if $(r, s) \in \Pi \cap \Pi_+$ and $S_{rsit} = -1$ if $(r, s) \in \Pi \setminus \Pi_+$. Thus, S_{rsit} is not, in fact, a function of the dependent variable. Its definition above (as $S_{rsit} = \mathrm{sgn}(P_{rsit})$ and so on) is merely a convenient practical representation which demonstrates how the values of S_{rsit} are calculated.

While estimates of (7) are invariant with Π, variable means and other statistics involving these means (such as the standard deviations of variables and the R^2 statistic) do depend on the choice of Π. To avoid this, the Π-dependent statistics reported below (in Table 1 and elsewhere)

are calculated with a zero mean (or equivalently, over the set of all pairs, $\{(r, s)|r \neq s\}$).

Regressions are run separately for each i and each t. Thus, the sequence of estimates $\{\beta_{it}\}_{t=1, \ldots, T}$ provides an evolving pattern of market integration during the time span 1, ..., T (by submarket i). Besides that, in most instances panel estimations are run, thus providing an estimate, aggregated over the entire span, of the impact of one or other factor on market integration. Since distances are not time-dependent, the random effects model is implemented. To identify factors hindering market integration, additional variables are entered into Equation (7).

All estimations are run over three samples of regions:

(1) entire Russia;

(2) Russia excluding difficult-to-access regions, where prices are high due to expensive shipping but incomes are also high owing to the so-called "northern increments" to wages (and so this could yield spurious dependence of prices on incomes);

(3) the European part of Russia excluding its northern territories (for brevity, hereafter referred to as simply European Russia), which has relatively favorable conditions for arbitrage within this group of regions (*i.e.*, due to the absence of such impediments like long distances, poor communications, *etc.*).

3.2. Data

Capital cities of regions are used as representatives of regions. Since reasonably complete data are lacking for a number of Russian regions, 74 regions (of all the 89 constituting the Russian Federation) are covered with the basic sample being used. The omitted regions are as follows: all the 10 autonomous *okrugs*, Chechen Republic, Republic of Ingushetia, the Jewish Autonomous Oblast, the Moscow Oblast, and the Leningrad Oblast (the last two are omitted because their capital cities, Moscow and Saint Petersburg, are at the same time separate subjects of the Russian Federation reckoned among the 89 regions). To obtain the sample representing Russia excluding difficult-to-access regions, the Murmansk Oblast, Sakha (Yakut) Republic, the Kamchatka Oblast, the Magadan Oblast, and the Sakhalin Oblast are removed from the basic sample. The sample called European Russia covers all regions belonging to the European part of the country except for Komi Republic, the Arkhangelsk Oblast, the Nenets Autonomous Okrug, and the Murmansk Oblast. Hence, there are 2701 ($= 74 \times 73/2$) region pairs across entire Russia,

2346 pairs excluding difficult-to-access regions, and 1275 pairs across European Russia.

Distances are mostly railroad distances. These are drawn from the Tariff Manual (1965) and updated (as well as supplemented with highway, sea and river distances for regions having no railway communication) with the use of modern geographical atlases.

Three kinds of price data are used. The first is the cost of the basket of basic food goods accepted as standard by Goskomstat. The basket is not uniform during the years of transition. Throughout 1992 – 1996, it includes 19 goods; beginning in December 1993, the cost of the 25-item basket is contemporaneously provided, having replaced the former since January 1997. The composition and the structure of both baskets are reported in Appendix B. The periods involved are every December from 1992 through 1999; regions are represented by their capital cities. The basic income data include monthly per capita incomes during the relevant periods. The sources of the price and income data are Goskomstat (1996), pp. 139 – 141, Goskomstat (1998a), pp. 97 – 99, and Goskomstat (1999a), pp. 397 – 399, 405 – 406; data for 1999 are obtained from the Goskomstat database;[4] costs of the 25-item basket for 1992 are obtained directly from Goskomstat of Russia.

The second kind of the data is spatial (inter-regional) consumer price indices calculated by Surinov (1999) for January 1997 and 1998. The indices cover the same wide set of commodities as the official temporal CPI (but, unlike the latter, the weight system implemented for the aggregation is uniform across regions and for both periods). Two components of the overall spatial index are analyzed here, namely, the food price index and the industrial goods price index that involve 74 and 144 goods correspondingly as judged by Goskomstat (1998b).

The third kind of data is prices for a number of individual goods. These data are dissimilar in terms of both sets of goods in various years and the form of the data. Prices drawn from Goskomstat (1996a), pp. 90 – 104 are provided for each December between 1992 – 1995 across regional capital cities; 10 food goods are covered. Besides that, prices have been calculated from the purchasing power of monthly incomes reported by Goskomstat (1998c), pp. 99 – 101, 252 – 257; Goskomstat (1999b), pp. 101 – 103, 253 – 258; and Goskomstat (2000b), pp. 116 – 118, 294 – 299. These data are averaged over the relevant year; the commodity sets contain 8 food goods and 6 industrial goods

[4] It not reported whether the observations for 1998 and 1999 refer to regional capital cities; most probably, the data are aggregated over each region.

for 1997, and 12 food goods and 6 industrial goods (of the latter, only 3 are the same as in 1997) for 1998 and 1999. Unfortunately, data on prices of individual goods for 1996 were not found.

Trading costs in large and medium shops relative to retail sales are used as an indicator of retail distribution costs, and net revenue (calculated as the difference of sale proceeds and purchase value of goods) in large and medium shops is used as an indicator of the wholesale-retail margin. The sources of the data are Goskomstat (1996b), pp. 38 – 43, and Goskomstat (1998d), pp. 160 – 161, 164 – 165. These data span 1993 – 1997 (although Goskomstat (1999d) provides data for 1998, they are reported there in monetary terms only; data on sales of large and medium shops is lacking). To fill the gap of 1998 – 1999, the values for 1997 are extended to these years.

3.3. Robustness Checks

Incomes. Since December per capita incomes are used as the measure of incomes, there may be some doubts as to the validity of the results. First, December incomes could suffer from fluctuations caused by, *e.g.*, Christmas bonuses, *etc.* Second, modern Russian statistical data on incomes are rather unreliable. Therefore, three other indicators of incomes were tried: per capita income averaged over the year, surveyed per capita household pecuniary income, and wages. All three had a minor impact on the quantitative results, and did not affect the qualitative pattern at all. Moreover, these measures turn out to be closely (sometimes, almost functionally) linked to one another as well as to the indicator used. Thus it is felt that although the absolute levels of incomes are not reliable, their inter-regional ratios are not far from truth.

Spatial correlation. It is not inconceivable that prices in neighboring regions are related to each other. In this case, prices would be spatially correlated; hence, standard errors of estimates in (7) would turn out to be inconsistent. Spatial econometrics provides tools to handle spatial correlation; see Anselin (1988, 1999). However, using region pairs, these tools do not directly apply, since the region pair by itself is not a location object which spatial econometrics deals with (*e.g.*, it is vague what is the distance between a region pair, and what are neighboring pairs).

To overcome this impediment, the following approach was implemented. Equation (7) may be thought of as being the difference of two equations (to economize notations, the indices i and t are omitted)

$$\ln P_l = \alpha' + \beta \ln I_l + \nu_l \qquad (8)$$

with $l = r$ and $l = s$, being augmented with the term $(\alpha + \gamma L_{rs})S_{rs}$. Then

$$\varepsilon_{rs} = (\nu_r - \nu_s) + \mu_{rs}, \tag{9}$$

where μ_{rs} is an additional residual component being induced by inserting the distance term. It is reasonable to suppose that ν_r and ν_s are not correlated with μ_{rs}, but they may be correlated with one another (the correlation just reflecting the presence of spatial correlation). Also, μ_{rs} are assumed to be uncorrelated with each other. Then elements of the covariance matrix for (7), $\mathbf{\Omega} = (\omega_{(rs)(pq)})$, take the form:

$$\omega_{(rs)(pq)} = \mathrm{Cov}(\varepsilon_{rs}, \varepsilon_{pq}) = \mathrm{Cov}(\nu_r, \nu_p) - \mathrm{Cov}(\nu_r, \nu_q) - \mathrm{Cov}(\nu_s, \nu_p) + \\ + \mathrm{Cov}(\nu_s, \nu_q) = o_{rp} - o_{rq} - o_{sp} + o_{sq} \qquad (r, s) \neq (p, q), \tag{10a}$$

$$(\omega_{(rs)(rs)}) = \sigma^2(\mu_{rs}) + \sigma^2(\nu_r) + \sigma^2(\nu_s) - 2\mathrm{Cov}(\nu_r, \nu_s) = \\ = \sigma^2(\mu_{rs}) + o_{rr} + o_{ss} - 2o_{rs}, \tag{10b}$$

where $\mathbf{O} = (o_{rs})$ is the covariance matrix of residuals in (8). Thus, under the stated assumptions, the off-diagonal term of the covariance matrix for the region pair model can be expressed in terms of the covariance matrix for the model dealing directly with location objects, namely, single regions.

The matrix $\mathbf{O}$ was estimated with the use of nonlinear regression:

$$\hat{\nu}_r\hat{\nu}_s = \kappa + \rho\exp(\lambda L_{rs}) + \xi_{rs}; \tag{11}$$

the expected signs of the estimates are as follows: $\kappa < 0$, $\rho > 0$, $\lambda < 0$.

With this, two versions of $\hat{\mathrm{O}}$ were constructed, the homoscedastic one, in which $\hat{\mathrm{O}}_{rs} = \hat{\kappa} + \hat{\rho}\exp(\hat{\lambda}L_{rs})$ for each r, s (thus, $\hat{\mathrm{O}}_{rr} = \hat{\kappa} + \hat{\rho}$ in it), and the heteroscedastic one, in which diagonal terms were estimated as $\hat{\mathrm{O}}_{rr} = \hat{\nu}_r^2$. The matrix $\hat{\Omega}$ was constructed of elements of $\hat{\mathrm{O}}$ according to (10a); *e.g.*, with homoscedastic $\hat{\mathrm{O}}$,

$$\hat{\omega}_{(rs)(pq)} = \hat{\rho}[\exp(\hat{\lambda}L_{rp}) - \exp(\hat{\lambda}L_{rq}) - \exp(\hat{\lambda}L_{sp}) + \exp(\hat{\lambda}L_{sq})] \\ (r, s) \neq (p, q); \tag{12}$$

estimates of the diagonal terms of $\hat{\Omega}$ were $\hat{\omega}_{(rs)(rs)} = \hat{\varepsilon}_{rs}^2$.

To take advantage of the service of standard econometric packages, the GLS was implemented as follows. Let $\mathbf{P} = \mathbf{Xc} + \boldsymbol{\varepsilon}$ be the matrix representation of (7). The transformation $\mathbf{P}^* = \mathbf{\Omega}^{-1/2}\mathbf{P}$, $\mathbf{X}^* = \mathbf{\Omega}^{-1/2}\mathbf{X}$, $\boldsymbol{\varepsilon}^* = \mathbf{\Omega}^{-1/2}\boldsymbol{\varepsilon}$ provides a model $\mathbf{P}^* = \mathbf{X}^*\mathbf{c} + \boldsymbol{\varepsilon}^*$, which when estimated with

the OLS, yields, as is easy to see, the same results as the GLS does, $\hat{\mathbf{c}}^{*} = \hat{\mathbf{c}}_{\mathrm{GLS}}$.

In all instances, the coefficient standard errors corrected for spatial correlation turn out to be almost the same as the White heteroscedastic-consistent errors. The coefficient estimates themselves almost do not change at all, too. However, spatial correlation is present, generally, in the generating model (8). From this it may be concluded that the distance variable in the "pairwise" model (7) captures the interactions between regions, so eliminating the spatial correlation (hence, existence of the latter in model (8) is probably caused by a missing interaction variable).

Only cross-sections were tested for spatial correlation. Attempts to perform this with panels — in particular, using methods implemented by Baltagi and Li (1999) — failed because of the cumbersome matrix $\mathbf{\Omega}$ having the size of 1275×1275 to 2701×2701 for each cross-section. Nevertheless, deducing from the results obtained for cross-sections, it is believed that spatial correlation is not present in the panels as well.

4. PATTERN OF RUSSIA'S MARKET INTEGRATION

4.1. Relationship between Price and Demand Differences

Food baskets. Table 1 tabulates standard deviations of the price differential, $\sigma_{it}(P_{rsit})$, for costs of the 19- and 25-food baskets (for brevity, hereafter referred to as "price-19" and "price-25") as well as those of income differential, $\sigma_t(I_{rst})$. As would be expected, the volatility of basket costs turns out to be far less — decreased by 14 to 38% — when difficult-to-access regions are omitted from consideration. As one excludes Asian and northern regions from the remainder of the country, so obtaining European Russia, the basket cost volatility drops significantly further. However, the decrease is predominantly smaller than in the first case.

The temporal behavior of price variability in Table 1 supports the finding of the papers cited in the introduction that price dispersion across Russian locations tends to fall with time. The volatility of the basket prices increases towards the end of 1993, and permanently diminishes afterwards (in European Russia, the decrease begins in 1993). By December of 1999, it falls 1.8-fold against the maximum, and 2.2-fold if difficult-to-access regions are not taken into account. In contrast with this, the in-

Table 1. Volatility of Food Basket Costs and Incomes.

Period	All regions (2701 observations)			Excluding difficult-to-access regions (2346 observations)			European Russia (1275 observations)		
	Price-19	Price-25	Income	Price-19	Price-25	Income	Price-19	Price-25	Income
1992:12*	0.308	0.333	0.466	0.264	0.285	0.386	0.257	0.281	0.296
1993:12	0.404	0.392	0.492	0.325	0.325	0.405	0.211	0.245	0.339
1994:12	0.374	0.349	0.531	0.272	0.256	0.472	0.195	0.201	0.394
1995:12	0.338	0.327	0.581	0.247	0.233	0.515	0.191	0.173	0.491
1996:12	0.330	0.314	0.571	0.211	0.208	0.507	0.129	0.125	0.486
1997:12	—	0.289	0.546	—	0.178	0.456	—	0.116	0.417
1998:12	—	0.238	0.593	—	0.180	0.510	—	0.150	0.507
1999:12	—	0.222	0.585	—	0.147	0.523	—	0.120	0.512

* 2415 observations for all regions, 2145 observations for Russia excluding difficult-to-access regions, 1128 observations for European Russia.

come volatility rises towards the end of 1995, stabilizes in 1996, and only then begins to fall. But, by the end of 1998, it increases again (evidently, as a consequence of the the August 1998 financial crisis). The general pattern of price volatility does not change if the standard deviations are calculated over regional subsamples, *i.e.*, excluding difficult-to-access regions or excluding Asian and northern regions. The exception is 1998; while price volatility decreases across the entire Russia as compared with the previous period, it remains unchanged if the difficult-to-access regions are eliminated, and the volatility rises across European Russia's regions. Thus, the crisis of 1998 has acted in an opposing manner on different parts of the country; it has increased price volatility in European Russia and has diminished it in the northern regions, Siberia and the Far-Eastern regions.

The results on the impact of inter-regional demand differences and distance on inter-regional differences in costs of the food baskets are summarized in Table 2. Throughout this paper, standard errors are in parentheses; ***, **, and * denote significance at the 1%, 5% and 10% levels. Except for Table 6, standard errors being reported are the White heteroscedasticity-consistent errors for cross-sectional regressions, and the panel heteroscedasticity-corrected errors for panel regressions.

The results indicate a strong positive relationship between prices and incomes during the whole time span considered. All estimates of β are

Table 2. Impact of Income and Distance on the Costs of the Food Baskets.

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1992:12	Income	0.161 (0.009)***	0.207 (0.012)***	0.116 (0.009)***	0.129 (0.012)***	0.118 (0.016)***	0.130 (0.021)***
	Distance	0.044 (0.004)***	0.039 (0.005)***	0.020 (0.004)***	0.013 (0.005)***	0.020 (0.006)***	0.012 (0.008)
1993:12	Income	0.225 (0.009)***	0.186 (0.010)***	0.150 (0.010)***	0.111 (0.009)***	0.060 (0.012)***	0.058 (0.012)***
	Distance	0.140 (0.005)***	0.118 (0.004)***	0.112 (0.005)***	0.093 (0.005)***	0.018 (0.006)***	0.026 (0.007)***
1994:12	Income	0.249 (0.008)***	0.246 (0.008)***	0.142 (0.008)***	0.142 (0.007)***	0.138 (0.009)***	0.133 (0.009)***
	Distance	0.123 (0.004)***	0.102 (0.004)***	0.085 (0.004)***	0.062 (0.004)***	0.017 (0.005)***	0.019 (0.005)***
1995:12	Income	0.153 (0.008)***	0.161 (0.007)***	0.079 (0.006)***	0.084 (0.006)***	0.078 (0.007)***	0.096 (0.006)***
	Distance	0.113 (0.004)***	0.115 (0.003)***	0.063 (0.004)***	0.067 (0.003)***	0.008 (0.005)*	0.007 (0.004)*
1996:12	Income	0.157 (0.008)***	0.140 (0.008)***	0.065 (0.005)***	0.054 (0.005)***	0.080 (0.005)***	0.068 (0.005)***
	Distance	0.147 (0.004)***	0.139 (0.004)***	0.084 (0.003)***	0.083 (0.003)***	−0.000 (0.003)	0.007 (0.003)**
1997:12	Income	—	0.195 (0.008)***	—	0.084 (0.005)***	—	0.095 (0.006)***
	Distance	—	0.118 (0.003)***	—	0.066 (0.003)***	—	0.013 (0.003)***
1998:12	Income	—	0.126 (0.005)***	—	0.076 (0.005)***	—	0.074 (0.006)***
	Distance	—	0.066 (0.003)***	—	0.034 (0.003)***	—	−0.008 (0.004)**
1999:12	Income	—	0.149 (0.005)***	—	0.092 (0.004)***	—	0.103 (0.005)***
	Distance	—	0.073 (0.003)***	—	0.028 (0.002)***	—	−0.003 (0.003)
Panel	Income	0.186 (0.004)***	0.167 (0.003)***	0.102 (0.004)***	0.088 (0.002)***	0.084 (0.004)***	0.083 (0.003)***
	Distance	0.115 (0.002)***	0.099 (0.001)***	0.074 (0.002)***	0.057 (0.001)***	0.012 (0.002)***	0.009 (0.002)***

statistically significant (at the level of better than 0.1%) and have the expected positive sign. However, except for two cases, the sensitivity of the price differential variation to change in the income differential is higher than to the change in distance; not infrequently, the difference is as much as several times.

Considering the sample of all regions, the estimates of the coefficient on income range from 0.126 to 0.249 over the years. Since β represents the elasticity of price to income, this implies that a 1-percent change in per capita income yields a 0.13 to 0.25 percent change in the food basket cost in the same direction. The panel estimates corroborate a strong price-income relationship over the whole set of cross-sections. The coefficient on distance is highly significant too in all estimations, but its values ranging from 0.039 to 0.147 are, as a rule, sufficiently smaller than those of the income coefficient. The panel estimates suggest the difference between these coefficients to be 1.6 – 1.7-fold.

Excluding difficult-to-access regions, all values of β dramatically decrease — 1.4 to 2.6-fold (γ goes down, too, as it must). Nevertheless, this affects neither the statistical significance of the estimates nor — except for the only case — the qualitative pattern of the coefficient behavior in time. Hence it follows that the regions with difficult access play an important role in explaining the dependence of prices on incomes across the whole country; however, they only account for a certain share of the dependence, since the price-income relationship still remains strong across the remaining regions.

When the Asian and European northern territories are removed, the statistical significance of the estimates of β remains intact, too. As compared with the previous subsample, their values do not always decrease. A marked decrease is seen only for 1993; in a number of cases, β rises in European Russia relative the whole country excluding difficult-to-access regions. Besides that, both decreases and increases in β are for the most part not substantial. Hence it may be concluded that European Russia cannot be thought of as much, if at all, more integrated than the remainder of the country excluding regions with difficult access. This is surprising evidence: seemingly, one might expect European regions to move faster towards integration than the rest of Russia, where regions are mostly far apart. As for distance, when the Asian and North-European regions of the country are eliminated, values of γ fall dramatically, turning out to be statistically insignificant in a few years.

However, the question of to what extent the results reported relate to integration of product market proper, and to what extent to that of adjacent markets (market for distribution services and labor market) remains open. In other words, this is a question as to how robust these results are to the inter-regional differences in the non-tradable component of

goods. The answer is presented in Table 3, which provides the estimation results for model (7) augmented with the distribution costs variable $\ln(c_{rt}/c_{st})$. Lacking data for 1992, this year is omitted; since that year features high instability of economic indicators, it would be illegitimate to extend the values of nearby years to 1992 as is done for 1998 – 1999.

Table 3. The Role of Distribution Costs in Price Differences.

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1993:12	Income	0.213 (0.009)***	0.173 (0.009)***	0.149 (0.010)***	0.110 (0.009)***	0.059 (0.012)***	0.055 (0.012)***
	Distance	0.128 (0.005)***	0.106 (0.005)***	0.106 (0.005)***	0.089 (0.005)***	0.018 (0.006)***	0.027 (0.007)***
	DC	0.064 (0.009)***	0.067 (0.009)***	0.034 (0.009)***	0.028 (0.009)***	–0.009 (0.011)	–0.025 (0.012)**
1994:12	Income	0.240 (0.008)***	0.238 (0.008)***	0.143 (0.008)***	0.143 (0.007)***	0.144 (0.009)***	0.140 (0.009)***
	Distance	0.110 (0.004)***	0.090 (0.004)***	0.080 (0.004)***	0.057 (0.004)***	0.017 (0.005)***	0.019 (0.005)***
	DC	0.070 (0.007)***	0.075 (0.006)***	0.036 (0.006)***	0.039 (0.006)***	0.020 (0.007)***	0.022 (0.007)***
1995:12	Income	0.144 (0.007)***	0.153 (0.007)***	0.078 (0.006)***	0.083 (0.006)***	0.077 (0.007)***	0.095 (0.006)***
	Distance	0.096 (0.004)***	0.098 (0.004)***	0.059 (0.004)***	0.063 (0.003)***	0.008 (0.005)*	0.007 (0.004)*
	DC	0.086 (0.010)***	0.087 (0.010)***	0.027 (0.007)***	0.029 (0.006)***	–0.015 (0.007)**	–0.016 (0.006)**
1996:12	Income	0.162 (0.008)***	0.145 (0.007)***	0.073 (0.006)***	0.065 (0.006)***	0.098 (0.005)***	0.090 (0.005)***
	Distance	0.122 (0.004)***	0.113 (0.004)***	0.075 (0.003)***	0.072 (0.003)***	–0.000 (0.003)	0.007 (0.003)**
	DC	0.141 (0.009)***	0.153 (0.008)***	0.064 (0.006)***	0.086 (0.006)***	0.055 (0.006)***	0.068 (0.005)***
1997:12	Income	—	0.192 (0.007)***	—	0.086 (0.005)***	—	0.101 (0.006)***
	Distance	—	0.103 (0.003)***	—	0.061 (0.003)***	—	0.013 (0.003)***
	DC	—	0.083 (0.007)***	—	0.031 (0.005)***	—	0.019 (0.005)***

Continued from p. 28

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1998:12	Income	—	0.128 (0.005)***	—	0.082 (0.005)***	—	0.078 (0.006)***
	Distance	—	0.050 (0.003)***	—	0.027 (0.003)***	—	–0.008 (0.004)**
	DC	—	0.088 (0.005)***	—	0.052 (0.005)***	—	0.019 (0.008)**
1999:12	Income	—	0.153 (0.004)***	—	0.100 (0.004)***	—	0.118 (0.005)***
	Distance	—	0.056 (0.003)***	—	0.021 (0.002)***	—	–0.003 (0.003)
	DC	—	0.098 (0.005)***	—	0.056 (0.004)***	—	0.051 (0.007)***
Panel	Income	0.180 (0.004)***	0.162 (0.003)***	0.100 (0.004)***	0.090 (0.002)***	0.087 (0.004)***	0.087 (0.003)***
	Distance	0.116 (0.002)***	0.089 (0.001)***	0.081 (0.002)***	0.056 (0.001)***	0.010 (0.002)***	0.009 (0.002)***
	DC	0.089 (0.004)***	0.093 (0.003)***	0.039 (0.004)***	0.044 (0.002)***	0.005 (0.004)	0.012 (0.003)***

DC — distribution costs of retail trade.

In most instances, distribution costs are highly significant and have the expected positive sign (except in two cases for European Russia in 1995). However, a comparison of Tables 2 and 3 suggests that the addition of this variable has no essential influence on the other estimates; these change only slightly. Besides that, although a decrease in the dependence between prices and incomes prevails, an increase occurs in a number of instances. Hence the apprehension that the income variable *considerably* incorporates the effect of distribution costs is not corroborated.

To verify this, one more way of taking into account distribution costs was tried: "cleaning" prices from these costs, according to (5). The relevant results are tabulated in Table 4.

Table 4. Impact of Income and Distance on Food Basket Cost Cleared of Distribution Costs.

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1993:12	Income	0.156 (0.009)***	0.121 (0.009)***	0.131 (0.010)***	0.091 (0.010)***	0.086 (0.013)***	0.053 (0.014)***
	Distance	0.099 (0.005)***	0.077 (0.004)***	0.083 (0.005)***	0.066 (0.005)***	0.017 (0.006)***	0.023 (0.007)***
1994:12	Income	0.167 (0.007)***	0.154 (0.007)***	0.123 (0.008)***	0.125 (0.007)***	0.167 (0.010)***	0.171 (0.009)***
	Distance	0.097 (0.004)***	0.082 (0.004)***	0.064 (0.004)***	0.044 (0.004)***	0.019 (0.005)***	0.023 (0.005)***
1995:12	Income	0.117 (0.006)***	0.128 (0.006)***	0.082 (0.006)***	0.091 (0.006)***	0.094 (0.008)***	0.118 (0.008)***
	Distance	0.052 (0.003)***	0.052 (0.003)***	0.031 (0.003)***	0.032 (0.003)***	0.010 (0.005)**	0.011 (0.004)**
1996:12	Income	0.101 (0.007)***	0.081 (0.007)***	0.065 (0.008)***	0.048 (0.007)***	0.130 (0.006)***	0.115 (0.006)***
	Distance	0.073 (0.003)***	0.065 (0.003)***	0.036 (0.003)***	0.032 (0.003)***	0.001 (0.004)	0.004 (0.004)
1997:12	Income	—	0.113 (0.006)***	—	0.081 (0.007)***	—	0.134 (0.007)***
	Distance	—	0.056 (0.003)***	—	0.031 (0.003)***	—	0.010 (0.004)***
1998:12	Income	—	0.079 (0.005)***	—	0.089 (0.006)***	—	0.114 (0.007)***
	Distance	—	0.015 (0.002)***	—	0.008 (0.003)***	—	−0.008 (0.004)*
1999:12	Income	—	0.092 (0.005)***	—	0.098 (0.006)***	—	0.145 (0.007)***
	Distance	—	0.028 (0.002)***	—	0.016 (0.002)***	—	0.005 (0.004)
Panel	Income	0.131 (0.004)***	0.112 (0.002)***	0.097 (0.004)***	0.092 (0.003)***	0.115 (0.005)***	0.118 (0.003)***
	Distance	0.081 (0.002)***	0.054 (0.001)***	0.054 (0.002)***	0.033 (0.001)***	0.011 (0.003)***	0.009 (0.002)***

With this method of accounting for distribution costs, the dependence of prices on incomes distinctly weakens. But its statistical significance still remains high in all cases. The qualitative pattern of the temporal price behavior remains essentially the same as well. Along with this, one aspect, which is slightly perceptible in Tables 2 and 3, turns out to be very pronounced. Figures from Table 4 provide evidence that after 1993 the market of European Russia becomes more segmented than that of the entire country excluding difficult-to-access regions, and beginning in 1996, than that of the entire country even including these regions. Such a result is attributable to the fact that the "northern increments" to wages in the northern and eastern territories raise distribution costs, and this obscures to some extent the actual difference in market integration between European Russia and the rest of the country; controlling for this, the difference becomes evident. Hence it follows that the relationship between prices and incomes does partially incorporate the influence of distribution services.

As an alternative measure, the retail-wholesale margin, m_{rt}, was implemented. It is incorporated in the model in the same manner as was c_{rt}, *i.e.*, as the additional variable or for price "clearance." The estimation results are reported in Appendix C. The figures are closely similar to these obtained with the distribution costs indicator, as it is seen from comparison of Table 3 with C1 and Table 4 with C2. This is of no surprise since the indicators are closely correlated with one another. The coefficient of correlation between c_{rt} and m_{rt} over 1993 – 1999 is equal to 0.82 (ranging by year from 0.73 to 0.95); the correlation between $(1 - c_{rt})$ and $(1 - m_{rt})$ is 0.63 (from 0.51 to 0.93 by year).

Thus, the difference in distribution costs is responsible for some share of the price dispersion, and so, in the absence of a relevant variable in the regression, its role is picked up by the income variable. However, using distribution costs yields no *fundamental* changes in inference. And so, it is possible to dispense with taking into account the distribution costs (at least, while analyzing the Russian market). Some details of the qualitative pattern of price behavior may be lost, but it will essentially be similar.

The findings reported can be interpreted as bearing witness to poor market integration in Russia even at present. Since the relationship between prices and incomes remains to be significant and rather strong even though distances and distribution costs as well as territories with difficult access are controlled for, this implies that there are more serious barriers to trade between the regions than distances.

The evolving pattern of integration is largely the same, be it obtained over all regions or their subsamples. The fragmentation of the market increases until the period 1994:12 and then permanently falls (up to half

and more in the terms of β) with the exceptions of 1997 and 1999. On the whole, it can be argued that beginning in about 1994 – 1995, the general tendency is an improvement in Russian internal market integration. The far from obvious result is that despite the increase of price volatility by the end of 1998 in European Russia due to the August crisis, the degree of fragmentation, on the contrary, has fallen here. The decline in integration in 1997 seems quite puzzling as, according to aggregate measures such as inflation, GNP growth, and foreign direct investment, this year was the most successful as compared with all preceding years. The degree of market fragmentation rose (though less) in 1999 as well. The reasons are obscure, too; most probably, this is a consequence of the 1998 crisis.

To quantitatively estimate the speed and direction of changes in the integration of the Russian market, the adopted integration measure for the 25-food basket is represented as $\beta = \beta_0 + \beta_1 t$ (where t is a year of the considered time span; $t = 0$ for the initial year) and is estimated over a panel. The basic model as well as the models with two ways of the incorporating both distribution costs indicators are implemented. For estimates of the basic model to be comparable with other versions, its estimations are performed over the panel of 1993 – 1999, in addition to the estimation over the entire span of 1992 – 1999. Table 5 summarizes the estimates obtained.

Table 5. Integration Trends (panel estimates of $\beta = \beta_0 + \beta_1 t$).

Version	All regions	Excluding difficult-to-access regions	European Russia
Basic model; 1992 – 1999	0.271 – 0.026*t* (0.006) (0.001)	0.174 – 0.022*t* (0.005) (0.001)	0.135 – 0.012*t* (0.007) (0.001)
Basic model; 1993 – 1999	0.268 – 0.031*t* (0.005) (0.001)	0.162 – 0.023*t* (0.005) (0.001)	0.113 – 0.009*t* (0.006) (0.001)
With the distribution costs variable	0.257 – 0.029*t* (0.005) (0.001)	0.162 – 0.022*t* (0.005) (0.001)	0.115 – 0.008*t* (0.006) (0.001)
With the retail-wholesale margin variable	0.260 – 0.031*t* (0.005) (0.001)	0.159 – 0.022*t* (0.005) (0.001)	0.113 – 0.008*t* (0.006) (0.001)
Price cleared from distribution costs	0.188 – 0.023*t* (0.005) (0.001)	0.132 – 0.012*t* (0.005) (0.001)	0.127 – 0.003*t* (0.006) (0.002)
Price cleared from retail-wholesale margin	0.189 – 0.022*t* (0.005) (0.001)	0.102 – 0.010*t* (0.005) (0.001)	0.091 – 0.0005*t* (0.006) (0.002)

Except for two, all estimates in Table 5 are statistically significant at the 1% level. These two are estimates of the trend factor β_1 in European Russia that are provided by both models with "cleared" prices. In all instances the sign of the trend factor is negative, so suggesting that the prevailing tendency is, indeed, a decrease in market fragmentation, that is, an improvement in integration. As for the insignificant estimates, the significance level of the first one is 10.2%, and the estimate becomes significant over the panel of 1994 – 1999, having the same negative sign; the second turns out to be significant (and negative) over the panel of 1995 – 1999. Both the basic model and the models with the distribution costs variable provide coinciding results. However, clearing prices of the distribution costs, the rate of the decrease of market fragmentation falls markedly. Nevertheless, all the estimate versions are qualitatively similar. They indicate that eliminating difficult-to-access regions, the improvement in integration becomes slower; deceleration is more dramatic for European Russia.

To conclude this part of the analysis, let us consider some estimates relating to spatial correlation. To save room, these are reported only for the 25-food basket and for the heteroscedastic version of $\hat{\Omega}$. Table 6 presents values of ρ and λ obtained with regression (11) that are used for constructing the terms of the covariance matrix $\hat{\Omega}$, see (12).

Table 6. Spatial Correlation Factors.

Period	All regions		Excluding difficult-to-access regions		European Russia	
	ρ	$\lambda\times1000$	ρ	$\lambda\times1000$	ρ	$\lambda\times1000$
1992:12	0.014 (0.007)**	−1.600 (0.885)*	0.024 (0.011)**	−2.793 (1.254)**	0.029 (0.017)*	−3.529 (1.939)*
1993:12	0.045 (0.006)***	−1.092 (0.207)***	0.040 (0.005)***	−0.868 (0.180)***	0.037 (0.012)***	−3.247 (1.028)***
1994:12	0.023 (0.018)	−0.073 (0.088)	−0.006 (0.007)	0.140 (0.098)	0.011 (0.006)*	−3.305 (1.922)**
1995:12	0.024 (0.006)***	−0.133 (0.071)*	0.025 (0.012)**	−0.108 (0.083)	0.009 (0.005)	−3.671 (2.147)*
1996:12	0.040 (0.010)***	−0.105 (0.048)**	0.027 (0.006)***	−0.145 (0.061)**	0.008 (0.004)**	−4.481 (1.838)**
1997:12	0.022 (0.008)***	−0.095 (0.058)*	0.012 (0.003)***	−0.180 (0.080)**	0.005 (0.001)***	−1.980 (0.630)***
1998:12	0.022 (0.014)	−0.063 (0.058)	0.016 (0.013)	−0.082 (0.095)	0.012 (0.009)	−5.982 (3.329)*
1999:12	0.098 (0.643)	−0.008 (0.055)	0.004 (0.001)***	−0.205 (0.154)	0.007 (0.002)***	−3.788 (1.117)***

All estimates, except the sole estimate that is insignificant, have "correct" signs, *i.e.*, ρ is positive and λ is negative. One third of the estimates of the generating matrix **O** are insignificant, preventing **Ω** from being constructed in such cases. (What is the distinctive feature is the insignificance of the estimates for 1998 over all three region samples. This can be explained as follows. During the inflation shock provoked by the August crisis, prices in nearby regions simply had no time to influence each other). However, spatial correlation in generating model (8) takes place in two thirds of the instances. Curiously, $|\lambda|$ is one order of magnitude more in European Russia (with its relatively short distances between regions) than in the remainder of the country. This means that here the impact of regional prices on each other weakens much faster with distance. In general, given the long distances between Russian regions and the specific values of λ, the majority of exponents $\exp(\lambda L_{rs})$ differ little from zero. Taking into account as well the fact that $\bar{\omega}_{(rs)(rs)}$ is constructed, by (12), of their differences, it becomes clear that matrix **Ω** will be almost diagonal, and the standard error of parameters in (7) will be little affected as against the heteroscedasticity-consistent errors.

Spatial price indices. Table 7 reports results concerning the inter-regional consumer price indices. Covering three times as many goods, the food price index has smaller volatility across regions than the price-25 (since periods do not coincide for these two indicators, adjacent periods are matched for comparisons, that is, 1996:12 and 1997:1, 1997:12 and 1998:1).

Table 7. Summary Statistics and Estimation Results for the Spatial Price Indices.

Sample/Version/Variable	Foods		Industrial goods	
	1997:1	1998:1	1997:1	1998:1
Standard deviations of index differentials				
All regions (2701 obs.)	0.249	0.228	0.214	0.207
Excluding difficult-to-access regions (2346 obs.)	0.155	0.138	0.162	0.161
European Russia (1275 obs.)	0.081	0.078	0.152	0.147

Continued from p. 34

Sample/Version/Variable		Foods		Industrial goods	
		1997:1	1998:1	1997:1	1998:1
Coefficient estimates					
Basic model:					
All regions	Income	0.135 (0.006)***	0.164 (0.006)***	0.101 (0.005)***	0.120 (0.005)***
	Distance	0.118 (0.003)***	0.097 (0.002)***	0.055 (0.002)***	0.044 (0.002)***
Excluding difficult-to-access regions	Income	0.065 (0.004)***	0.081 (0.004)***	0.047 (0.004)***	0.071 (0.005)***
	Distance	0.072 (0.002)***	0.059 (0.002)***	0.025 (0.002)***	0.024 (0.002)***
European Russia	Income	0.068 (0.003)***	0.087 (0.004)***	0.043 (0.006)***	0.057 (0.006)***
	Distance	0.009 (0.002)***	0.007 (0.002)***	0.028 (0.004)***	0.023 (0.004)***
Model with the distribution costs variable:					
All regions	Income	0.140 (0.006)***	0.164 (0.006)***	0.098 (0.005)***	0.115 (0.005)***
	Distance	0.099 (0.003)***	0.083 (0.002)***	0.044 (0.002)***	0.035 (0.002)***
	Distribution costs	0.104 (0.006)***	0.078 (0.005)***	0.069 (0.006)***	0.055 (0.005)***
Excluding difficult-to-access regions	Income	0.071 (0.004)***	0.084 (0.004)***	0.049 (0.004)***	0.071 (0.005)***
	Distance	0.066 (0.002)***	0.054 (0.002)***	0.023 (0.002)***	0.021 (0.002)***
	Distribution costs	0.044 (0.004)***	0.032 (0.003)***	0.024 (0.004)***	0.026 (0.004)***
European Russia	Income	0.074 (0.003)***	0.090 (0.004)***	0.042 (0.006)***	0.061 (0.006)***
	Distance	0.009 (0.002)***	0.006 (0.002)***	0.028 (0.004)***	0.023 (0.004)***
	Distribution costs	0.019 (0.004)***	0.010 (0.003)***	−0.002 (0.007)	0.016 (0.006)***

Continued from p. 35

Sample/Version/Variable		Foods		Industrial goods	
		1997:1	1998:1	1997:1	1998:1
Index cleared from distribution costs:					
All regions	Income	0.075 (0.005)***	0.079 (0.004)***	0.045 (0.004)***	0.048 (0.004)***
	Distance	0.042 (0.002)***	0.031 (0.002)***	0.003 (0.002)	0.008 (0.002)***
Excluding difficult-to-access regions	Income	0.059 (0.006)***	0.067 (0.006)***	0.045 (0.005)***	0.056 (0.005)***
	Distance	0.022 (0.002)***	0.019 (0.002)***	0.001 (0.003)	0.007 (0.002)***
European Russia	Income	0.112 (0.004)***	0.124 (0.006)***	0.076 (0.008)***	0.108 (0.008)***
	Distance	0.004 (0.003)	0.001 (0.003)	0.027 (0.005)***	0.022 (0.005)***

The behavior of the index and the price-25 is the same. As with the price-25, the standard deviations decrease if one eliminates difficult-to-access regions and then Asian and northern regions from the sample. Again, the degree of fragmentation dramatically falls when the difficult-to-access regions are separated, but the decrease is unnoticeable if the case in hand is European Russia; using the index cleared from distribution costs, it becomes evident that market integration in European Russia is poorer as compared with the remainder of the country. At last, the fragmentation increases in going from 1997:1 to 1998:1 as with going from 1996:12 to 1997:12 in the case of the price-25. Moreover, matching values of estimates (including those obtained by taking into account the distribution costs) are very close to each other. Thus, it can be stated that the basket of 25 foods is a good representative of foodstuffs as a whole (at least, of these covered by Goskomstat's CPI).

The volatility of the industrial goods price index, calculated over all regions, is smaller than that of foods. But the former becomes similar to the latter if difficult-to-access regions are excluded; in European Russia, the standard deviation of the industrial goods index differential is almost twice as much as that of the food index differential. Nevertheless, estimates of β are smaller for the industrial good price index than for the food price index in all cases. The fragmentation of the market rises, again, in going from January of 1997 to January of 1998.

The dependence of prices for industrial goods on distance, *i.e.*, transportation costs, over the entire country is weaker than for that of foods, but it is stronger when the case in hand is European Russia. As a consequence, the impact of this factor turns out to be the same both over the entire country excluding difficult-to-access regions and over European Russia.

The lower values of β indicate that the industrial goods market is more integrated than the food market. On the one hand, this seems rather likely, since regional protectionism, price regulations and so on deal almost only with foodstuffs. But, on the other hand, such a result is not in agreement with the previous one obtained by Gluschenko (2001a) through the cointegration analysis of the temporal food and industrial goods price indices over Western Siberia. A possible reason of the discrepancy may be the specificity of the Western-Siberian market or biases in regional CPIs (see Gluschenko, 2001b).

The consequences of taking into account distribution services are the same as with the food baskets. That is, the insertion of the relevant additional variable only slightly affects the dependence of price on income, and the "cleaning" from distribution costs slackens it, but not fundamentally. The same holds both for the distribution costs indicator and the retail-wholesale margin (results with the latter are reported in Appendix D). However, estimates yielded with the use of one or another diverge more than in the case of the food baskets. Probably, the point is that values of the "wholesale" price indices are nearer to true values than the "wholesale" cost of the basket of 19 or 25 foods, owing to the akin aggregation structure of the price index and the retail-wholesale margin proxy. In this case, the distinction between the distribution costs and the retail-wholesale margin comes into importance in spite of their high mutual correlation.

Individual goods. To save room, regressions without distribution costs are reported here. Taking into account these costs, the effects are the same as above. That is, changes of β are minor with distribution costs as an additional variable, and cleaning of prices from costs lowers β; the qualitative patterns remaining unaltered. Estimations of the impact of distribution costs can be found in the electronic version of the paper.

In Table 8 the panel data results on the impact of inter-regional demand differences and distance on differences in prices of individual foods are set out. These are goods that are involved in both the 19-item and 25-item basket (excluding vodka) and cover about a half of each basket

(see Appendix B). Whereas data for 1992 – 1995 are provided for each December, and indicators published for 1997 – 1999 are year averages, the two separate panels are isolated (recall that there are no data for 1996). Cross-sectional estimates corresponding to the panel ones in Table 8 are presented in the electronic version. All except a few statistically significant estimates have expected positive signs.

Table 8. Impact of Income and Distance on Prices of Individual Food Goods.

Good	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		1992 – 1995	1997 – 1999	1992 – 1995	1997 – 1999	1992 – 1995	1997 – 1999
Beef	Income	0.278 (0.007)***	0.134 (0.004)***	0.153 (0.006)***	0.076 (0.003)***	0.120 (0.009)***	0.082 (0.004)***
	Distance	0.108 (0.003)***	0.093 (0.002)***	0.049 (0.003)***	0.036 (0.002)***	0.034 (0.005)***	0.012 (0.003)***
Milk	Income	0.210 (0.009)***	0.207 (0.006)***	0.166 (0.010)***	0.132 (0.005)***	0.132 (0.015)***	0.115 (0.007)***
	Distance	0.085 (0.005)***	0.150 (0.003)***	0.060 (0.005)***	0.088 (0.003)***	0.051 (0.009)***	0.029 (0.004)***
Eggs	Income	0.116 (0.005)***	0.099 (0.004)***	0.038 (0.005)***	0.029 (0.003)***	–0.002 (0.008)	0.017 (0.004)***
	Distance	0.097 (0.003)***	0.137 (0.003)***	0.059 (0.003)***	0.071 (0.002)***	0.043 (0.005)***	0.009 (0.003)***
Frozen fish	Income	—	0.049 (0.005)***	—	0.095 (0.005)***	—	0.147 (0.007)***
	Distance	—	0.084 (0.002)***	—	0.067 (0.003)***	—	0.047 (0.005)***

Continued from p. 38

Good	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		1992 – 1995	1997 – 1999	1992 – 1995	1997 – 1999	1992 – 1995	1997 – 1999
Sugar	Income	0.089 (0.004)***	0.087 (0.004)***	0.055 (0.005)***	0.052 (0.004)***	0.050 (0.007)***	0.055 (0.006)***
	Distance	0.059 (0.002)***	0.071 (0.002)***	0.048 (0.003)***	0.048 (0.002)***	0.017 (0.004)***	0.020 (0.004)***
Vegetable oil[a]	Income	0.081 (0.008)***	0.092 (0.004)***	0.122 (0.007)***	0.075 (0.005)***	0.078 (0.010)***	0.082 (0.006)***
	Distance	0.125 (0.004)***	0.049 (0.002)***	0.098 (0.004)***	0.035 (0.002)***	0.077 (0.006)***	0.029 (0.005)***
Potatoes	Income	0.249 (0.008)***	0.154 (0.005)***	0.129 (0.008)***	0.091 (0.005)***	0.097 (0.012)***	0.086 (0.006)***
	Distance	0.089 (0.004)***	0.095 (0.003)***	0.044 (0.004)***	0.055 (0.003)***	0.078 (0.006)***	0.072 (0.005)***
White bread	Income	0.197 (0.008)***	0.170 (0.005)***	0.191 (0.010)***	0.101 (0.004)***	0.167 (0.014)***	0.094 (0.006)***
	Distance	0.047 (0.004)***	0.077 (0.003)***	0.026 (0.004)***	0.027 (0.002)***	0.048 (0.008)***	0.036 (0.004)***
Flour[a]	Income	—	0.174 (0.005)***	—	0.129 (0.005)***	—	0.161 (0.006)***
	Distance	—	0.071 (0.003)***	—	0.027 (0.002)***	—	0.027 (0.004)***
Rice[a]	Income	—	0.056 (0.004)***	—	0.071 (0.005)***	—	0.095 (0.006)***
	Distance	—	0.029 (0.002)***	—	0.036 (0.003)***	—	0.028 (0.005)***
Vermi-celli[a]	Income	—	0.172 (0.005)***	—	0.126 (0.006)***	—	0.130 (0.009)***
	Distance	—	0.060 (0.003)***	—	0.019 (0.003)***	—	–0.013 (0.007)***

Continued from p. 39

Good	Variable	All Regions		Excluding difficult-to-access regions		European Russia	
		1992 – 1995	1997 – 1999	1992 – 1995	1997 – 1999	1992 – 1995	1997 – 1999
Butter	Income	0.024 (0.006)***	0.099 (0.003)***	0.018 (0.007)**	0.076 (0.004)***	0.023 (0.009)**	0.085 (0.005)***
	Distance	0.035 (0.003)***	0.049 (0.001)***	0.035 (0.004)***	0.028 (0.002)***	–0.001 (0.006)	0.013 (0.003)***
Boiled sausage	Income	0.215 (0.012)***	—	0.149 (0.016)***	—	0.189 (0.030)***	—
	Distance	0.091 (0.004)***	—	0.050 (0.004)***	—	–0.005 (0.007)	—
Vodka	Income	0.157 (0.005)***	—	0.083 (0.006)***	—	0.065 (0.009)***	—
	Distance	0.089 (0.003)***	—	0.051 (0.003)***	—	0.047 (0.005)***	—

[a] 1998 – 1999 in columns "1997 – 1999".

As with the basket costs and price indices, elimination of difficult-to-access regions dramatically reduces, as a rule, the dependence of prices on incomes. However, there is no fundamental distinction between the remainder of the country and European Russia; rather submarkets of corresponding goods are less integrated in European Russia (unreported estimates with prices cleared of distribution costs corroborate this).

The results in Table 8 suggest that market integration tends to improve in going from the time span of 1992 – 1995 to the span of 1997 – 1999 as values of β fall, although not always. from estimates by year, it follows that market fragmentation does increase in 1997 as compared with 1995 in a number of cases. However, the fragmentation decreases from 1997 to 1998, sometimes increasing again in 1999. From the cross-sectional estimates as well, it can be seen that most goods provide similar evolving patterns of market integration. The pattern is that fragmentation rises

during 1992 – 1994, and then integration begins to improve with some deviations in 1997 and 1999.

By and large, prices of individual food goods behave in line with the behavior of aggregated price measures, that is, the costs of the food baskets and the spatial food price index. At the same time, estimates sufficiently vary across goods. It would take too much space to consider all these differences; therefore, let us limit ourselves to a portion of them.

For the most part, the maximum values of β across goods are for bread and milk. The explanation seems to be that the price for bread is most often subject to regulations, prices for bread being most intensively both directly regulated and subsidized just in poor regions, thus strengthening the dependence of these prices on incomes. As for milk, it is a perishable good, a minor share of which could be arbitraged (between neighboring regions). And so, one should expect a strong dependence of price on local demand.

The dependence of the dispersion of prices for milk on income dispersion is less in 1992 – 1995 than in 1997 – 1999. The opposite pattern is seen for butter, that is, the dependence is weak in 1992 – 1995, and it sharply strengthens in 1997 – 1999. Besides that, the relationship between the price for butter and income is much weaker in 1992 – 1995 than that of other goods. A possible reason is as follows. In the early years of market transformation, producers ran into great difficulties selling raw milk. To overcome these difficulties, they started processing milk into far less perishable products, butter and cheese, to an increasing extent. It seems likely that the resulting overproduction of butter necessitated maximizing the area of deliveries, and this sufficiently enhanced inter-regional competition. But at the same time, the production of milk was being cut down; thereafter, the overproduction of milk and dairy products was eliminated, and so, the dependence of the butter price differential on the income differential rose.

Eggs are perishables as well. Therefore, prices for them, like for milk, would seem to depend strongly on local demand. However, this dependence is rather weak (if difficult-to-access regions, where eggs are almost not produced at all, are not taken into account). In all likelihood, the reason is high elasticity of the demand for eggs, as opposed to the low-elastic demand for milk, which limits the possibilities of a rise in prices for eggs.

The dependence of the dispersion of prices for frozen fish on income dispersion features a sequential increase when excluding the difficult-to-access regions and then the remaining northern and Asian regions. The

point is that it is just the remote regions of the Far East, the difficult-to-access ones among them (*e.g.*, Kamchatka), that deliver frozen fish. In these regions, the price of frozen fish is much lower than in the European part of the country. Going from one regional sample to other is equivalent, in fact, to eliminating a portion of the fish-producing regions at first, and subsequently almost all of them.

For vodka, the abnormal (negative) dependence of price on income in 1992 is obtained. This may have a rational explanation. Traffic in vodka was extremely profitable during these years, and so, there were lots of mediators who took part in such activity. To maximize their gain, they were rushing primarily to rich regions, and thus were beating the prices down there. Afterwards, small mediators were ousted from; the explicit or latent protectionist policy of regional authorities regarding the trade in alcohol added to this.

Among the cross-sectional estimates of β, there is only one estimate that almost equals 1, that is, for sausage in 1992. The point is that sausage was something like a fetish in the late years of the Soviet era, the years of permanent shortage. Such special attitude toward this good resulted in high elasticity of price to local demand (measured by income per capita) in the first year of price liberalization.

The results concerning prices of individual industrial goods are tabulated in Table 9; details are given in the electronic version. Data on these prices are even more sketchy than the data on food prices and are available only for three years. For three goods (children's jackets, children's boots, and cigarettes) the estimates reported in Table 9 are cross-sectional, covering only 1997.

For all but one β and one γ, the panel estimates are positive, as expected. Of 54 estimates by year, 3 distance estimates and 5 income estimates are negative. Besides for statistical reasons, the negative relationships could be caused by the poor accuracy of raw data for 1997 (that is the only year where statistically significant negative values of β occur). Purchasing powers of incomes per capita are reported for 1997 as integers in Goskomstat (1988c). Given the expensiveness of clothes and footgear relative to monthly incomes per capita in many regions, the results are low precision of prices for such goods, which are calculated from purchasing power.

A more detailed pattern of the industrial goods market corroborates the above-stated conclusion drawn from the analysis of the spatial industrial good price index, that is, that this market is poorly integrated (however, this should be take with reservations as the goods in question comprise

Table 9. Impact of Income and Distance on Prices of Individual Industrial Goods.

Good	Variable	All regions	Excluding difficult-to-access regions	European Russia
Men's trousers, 1998 – 1999	Income	0.137 (0.007)***	0.129 (0.009)***	0.160 (0.012)***
	Distance	0.016 (0.003)***	0.008 (0.003)**	0.001 (0.006)
Shirts, 1997 – 1999	Income	0.061 (0.006)***	0.034 (0.007)***	0.027 (0.011)**
	Distance	0.050 (0.003)***	0.032 (0.003)***	0.063 (0.006)***
Women's blouses, 1998 – 1999	Income	0.131 (0.006)***	0.137 (0.006)***	0.161 (0.010)***
	Distance	0.001 (0.003)	0.008 (0.003)**	0.004 (0.006)
Skirts, 1998 – 1999	Income	0.151 (0.007)***	0.140 (0.009)***	0.187 (0.013)***
	Distance	−0.005 (0.003)	−0.010 (0.004)***	0.006 (0.007)
Jumpers, sweaters, 1997 – 1999	Income	0.081 (0.006)***	0.056 (0.007)***	0.036 (0.011)***
	Distance	0.070 (0.003)***	0.054 (0.003)***	0.040 (0.006)***
Gasoline, 1997 – 1999	Income	0.070 (0.003)***	0.018 (0.002)***	0.024 (0.003)***
	Distance	0.060 (0.002)***	0.019 (0.001)***	0.006 (0.002)***
Children's jackets, 1997	Income	0.082 (0.007)***	0.066 (0.007)***	0.034 (0.011)***
	Distance	0.028 (0.004)***	0.031 (0.004)***	0.010 (0.008)
Children's boots, 1997	Income	0.085 (0.007)***	0.067 (0.008)***	0.031 (0.007)***
	Distance	0.029 (0.004)***	0.030 (0.004)***	0.010 (0.006)
Filter cigarettes, 1997	Income	0.028 (0.005)***	0.002 (0.005)	−0.035 (0.006)***
	Distance	0.045 (0.003)***	0.033 (0.003)***	0.008 (0.005)*

only 6% of the set covered by the index). There are no indications of better integration in European Russia.

4.2. Summary and Discussion

In general, the findings reported allow us to conclude that the spatial behavior of consumer prices in Russia is inconsistent with the concept of how they should behave in an integrated market economy. However, the Russian market has features inherent in actual market economies.

First of all, distances matter, having a pronounced effect on price dispersion from the very beginning of transition. Berkowitz and DeJong (1999) obtained different results; they found no dependence of price dispersion on distance unless Russian regions were divided into two clusters, the "Red Belt" and the rest Russia. A possible reason may be that in their study price dispersion was represented by values averaged over 1992 – 1996. Since the pattern had been mixed during those years, as sequences of the cross-sectional estimations reported above show, this could hide the relationship between prices and distances. (It should be noted that in a later study, which will be considered below, these authors find the dependence of price dispersion on distance; moreover, they use it to measure integration).

Although distances are responsible for price differences, they are not fully responsible. There is a sufficient remainder that depends on inter-regional income dispersion. The same still holds if distribution costs are controlled for. Since income per capita is used as the proxy of relative demand in the study, this remainder is a representative of the integral effect of all barriers to arbitrage.

There is a "natural" impediment to market integration in Russia. That is, a cluster of difficult-to-access regions contributing markedly to price dispersion across the entire country. Due to this geographical feature, the Russian internal market cannot become fully integrated during any foreseeable time, be the Russian economy as advanced market economy as wished. Nevertheless, albeit weakening dependence of price differences on income dispersion, controlling for this factor does not eliminate the relationship. What is more, the market of European Russia with its more favorable conditions for arbitrage turns out to be less integrated than the market of Russia as a whole excluding difficult-to-access regions.

As noted above, there is no reference point to judge the economic significance of the relationships between prices and incomes as compared

to values for advanced market economies. Therefore one is forced to base judgements on the theoretical standard which suggests that there should not be a relationship between price and local demand over and above what is caused by transportation costs and the non-tradable component of the good. (However, it is important to bear in mind that such a comparison may be too severe for the Russian market, overstating its shortcomings, since it is unlikely that actual economies thought of as being integrated entirely match this speculative standard.) From this viewpoint, obtained magnitudes of β are mostly too much high, thus indicating poor integration among Russian regional markets.

Along with this, the general trend is improvement in integration in recent years. The fact that the measure of market fragmentation is decreasing with time testifies to (or, at least, provides a hope) that the Russian internal market is moving towards integration. In general, the evolving pattern of integration is as follows. Market fragmentation rose in the early years of transition, having peaked between 1994 and 1995. Then fragmentation diminishes though not steadily, with deviations from the tendency in 1997 and 1999.

It is interesting to compare this pattern with a pattern obtained with the use of a quite different methodology. Berkowitz and DeJong (2001) measure the extent of market integration in Russia as the percentage of integrated regions. Region r is deemed to be integrated at time t if the relationship between price dispersion and distances from this region to others is statistically significant. Price dispersion is measured as a standard deviation $\sigma_{rs}(t) = \sigma(\ln(P_{rt}/P_{st}))$ calculated over a 12-month period $t - T, \ldots, t + T$. Prices are represented by the cost of the basket of 25 food goods. The qualitative pattern obtained by these authors and the pattern presented above have much in common though they do not coincide in full. Berkowitz and DeJong find integration to deteriorate during 1996, while the above-reported results indicate that it rises from the end of 1995 to the end of 1996. However, both the studies provide evidence of improvement in integration in 1994 – 1995 and 1998. Besides that, the findings by Berkowitz and DeJong point to a dramatic fall in integration in 1997, like regressions reported in Section 4.1 do.

As mentioned in the introduction, there is one regression specification used by Engel and Rogers (1996) that can be correlated, to some extent, with the approach being used in this study. They explored the impact of the border on price dispersion among cities of the USA and Canada. In the equation being dealt with, the dependent variable is price volatility, calculated as the standard deviation $V_{rs}(P_{rs}) = \sigma(\ln(P_{rt}/P_{st}) - \ln(P_{r,\,t-2}/P_{s,\,t-2}))$ over a certain time span; the

explanatory variables are distance, a border dummy, and the volatility of real wages for manufacturing employees (which is calculated in the same manner as price volatility). It is reasonable to assume that wages are strongly correlated with personal incomes. Then the relevant variable in the Engel – Rogers regression may be treated as an analogue of the demand proxy in Equation (7).

Engel and Rogers obtained the wage dispersion coefficient to be positive for 13 of all of their 14 goods, and to be significant for 10. Its value equals 0.18 in the pooled regression covering all goods, while the distance coefficient is 0.000843. Hence, a 1-percent increase in wage volatility yields the same contribution to the rise in price volatility like the increase of distance by exp(2.135) = 8.5 times. For foodstuffs ("food at home/food purchased from stores"), this value is equal to $\exp(17.95) = 62.4 \times 10^6$; the coefficients respectively equaling 0.28 and 0.000156. The USA-Canada border contributes less, too, than wage dispersion, the coefficient on the border dummy being equal to 0.0114 for all goods, and 0.00674 for foodstuffs.

The authors assign the entire effect of wage dispersion to the difference in non-tradable marketing services (segmentation of labor markets). However, the importance of the effect casts some doubts, in light of the above presented results (see, *e.g.*, Table 3), on such an interpretation. Most probably, the wage-dispersion variable captures, along with the impact of the difference in marketing costs, a dependence of prices on local demands, which is caused by the imperfect integration of the goods market. An additional argument is that inclusion of the wage-dispersion variable does not much affect the border coefficient, but markedly reduces the distance coefficient (while inserting/deleting the income-dispersion variable into/from (7), changes in the distance coefficient are similar). As might be supposed, this suggests that the border variable nearly fully reflects the impact of impediments to trans-border trade, while the wage-dispersion variable captures the effect of impediments to intra-country arbitrage *within* both the USA and Canada.

Unfortunately, it is impossible to directly compare the quantitative results of Engel and Rogers with ours because of a significant difference in the construction of the price-dispersion and income-dispersion indicators. Nevertheless, their results are believed to be circumstantial evidence of the fact that integration in advanced market economies, also, is not too close to being perfect. If so, returning to the integration of the Russian internal market, the situation in Russia is not so disappointing as a comparison with the theoretical standard suggests.

5. CULPRITS BEHIND MARKET FRAGMENTATION

5.1. Potential Culprits

The results reported in Section 4.1 provide more evidence that there are sufficient and numerous impediments to commodity arbitrage in Russia. The issue hardly needs detailed consideration, since the literature discusses it thoroughly and provides a wealth of concrete examples, *e.g.*, Gardner and Brooks (1994), Berkowitz *et al*. (1998), Gluschenko (2001a), *etc.*

The following generalized factors impeding price equalizing across regions could be listed in addition to transportation and distribution costs:

- organized crime,
- regional protectionism,
- lack of information on arbitrage opportunities,
- institutional reasons (traditions in interregional trade ties and so on),
- regional sale taxes.

State intervention in the economy, *i.e.*, price regulations and subsides, are credited as being among these factors. However, it seems that, given the present weakly-integrated Russian consumer market, one can not say a priori whether such actions do increase inter-regional price dispersion. It is not inconceivable that nowadays they, quite the contrary, smooth price disparities to some extent.

Being represented as variables in price regressions, the factors listed above could explain why differences in local demand give rise to persistent price differences. Unfortunately, all of them are difficult to quantify. A number of indicators were tried that could be approximates of a portion of the above-stated inter-regional barriers. Additional variables included into Equation (7) are as follows.

Shipping conditions. In addition to distance, two variables are adopted to proxy shipping costs: the quality of the region's transportation infrastructure and regional freight tariffs. The former is drawn from Matiyasevich *et al*. (1998). This is an index from 0 to 1, such that the larger the number, the worse the region's transportation infrastructure. The index is based on the proximity of the region to a non-freezing port, proximity to a main transportation junction, the average distance between settlements, the number of road accidents per 100,000 population, the number of big airports, the airport capacity, the railway density, the density of railways in common use, the share of railways with electric power supply measured by length, car road density, inner water-ways

density, and the number of large sea ports. The variable for a pair of regions is constructed as the difference of the indices for these regions. Although the data used to calculate the index are dated to 1996, the index is believed to be inertial enough and is expanded over the entire span of time considered, 1992 – 1999.

The regional freight tariff variable is the logarithm of the ratio of the index of tariffs for freight shipments in regions of the pair. The index is taken relative to 1991, regional tariffs being supposed to be the same across all regions at that time. For this calculation, the official yearly indices are used; for 1995 – 1999, they are reported by Goskomstat (2000a), p. 156 – 157. Hence, the index is the level of freight tariff in the region at the end of a year (related to a uniform initial level). A potential source of inaccuracy exists here, since the actual initial values may differ across regions thus causing biases in the variable values. The second source of inaccuracy is the fact that the Goskomstat index involves kinds of transportation which are not used for the delivery of consumer goods, *e.g.*, air transport, pipeline transport, *etc.*

Both variables, the infrastructure and the regional freight tariff, are expected to enter into the regressions with a positive sign.

State intervention in economy. Two variables represent this factor: price regulations and subsidies. The former is the proportion of goods and services with regulated prices in the region during the first quarter of 1996; the data source is Goskomstat (probably, not published). The latter are production subsidies as a proportion of the regional budget expenditures in 1995; this information is from the RECEP (the firstprimary source is unknown). The relevant pairwise variables are the logarithm of the ratio of regional indicators. The same values are used for the entire time span considered. It is very probable that these values were changing sufficiently during this period. Beyond the years for which the indicators were calculated, they are interpreted as the proxies of the propensity to price regulating and subsidizing production in the region. But, of course, such approximation can be the cause of inaccuracies. Since the subject of price regulations is almost only prices for food, this variable is not included in the regressions of prices for industrial goods.

From the theoretical viewpoint, state intervention should hinder price equalization across regions, and so, the sign of both variables might be expected to be positive. However, as it has been stated above, there are some doubts whether this is always valid in modern Russia. And so, a negative sign will not be surprising as well.

Shuttle trade (small-scale cross-border informal trade) is an exotic feature inherent in many transitional economies. Thus, it is very interest-

ing to clarify its role in market integration. The TACIS (1996) report provides a quantitative evaluation of the phenomenon by region as shuttle trade in the region normalized to the average Russian one; the data date to 1995. The pairwise variable is the logarithm of the ratio between two regional indices; the same values are expanded to 1992 – 1999, thus approximating actual values beyond 1995. Since shuttle trade deals with industrial goods only, the variable is present in the regressions of prices for such goods, and is absent in regressions of food prices.

It is not clear in advance whether shuttle trade facilitates price equalization across regions, or hinders it. On the one hand, more intensive shuttle trade in a region can make competition more severe. But on the other hand, the costs of shuttle trade are rather high; because of this, it may be that the more intensive shuttle trade, the higher prices. So, the issue of the sign of the shuttle trade variable is a priori vague.

Organized crime. Two proxies of organized crime are available. The first is the total crime rate, *i.e.*, the number of registered crimes per 10,000 of the population. The source of (yearly) data is Goskomstat (1999c), pp. 256 – 257. The crime rate variable is the logarithm of the ratio of indicators for regions of a pair.

The second proxy describes the economic power of crime as the proportion of the regional economy controlled by criminal groups in 1995 or 1996 (the year is not clear from the source). The proportions across regions were estimated by analysts of *Arguments and Facts* [Аргументы и факты] weekly (Kakotkin, 1996) on the basis of data obtained from a scientific conference on the shadow economy, the Free Economic Society, and Russian Ministry of Internal Affairs. Brown and Earle (2000) quantify the relevant variable as equaling 1 if criminal groups control more than 50% of the economy, 0.75 if they control 35 – 50%, 0.5 if they control 20 – 35%, and 0.25 if they control less than 20%. The pairwise variable of the economic power of crime is constructed as the difference of these values for the regions belonging to the pair. The values are extrapolated over 1992 – 1999. Such an assumption, probably, is close to truth in the neighborhood of 1995 – 1996, the years for which the values are estimated. But clearly, far from these years, the inaccuracy of the assumption might turn out to be sizeable.

Correlation between the two measures of organized crime is weak. The correlation coefficients by year are reported in Table 10.

The correlation has signs varying across years and region samples; it peaks mainly in 1996. Probably this is just the year for which the economic power of crime has been evaluated. Table 10 suggests that the two proxies of organized crime are far from being similar versions of

each other. Supposedly, they reflect two different dimensions of organized crime (both being merely an approximation). The activity of criminal groups in legal business qualitatively differs from that of ordinary gangs; when occurring here, crimes as such are much more latent since they are mainly of economic nature. And so, it does not seem that more economic power of crime in a region would necessarily increase the total number of crimes. Based upon this, both variables are contemporaneously included into the regressions.

Table 10. Correlation between the Crime Rate and the Economic Power of Crime.

Year	Over region pairs			Over regions		
	All Regions	Excluding difficult-to-access regions	European Russia	All regions	Excluding difficult-to-access regions	European Russia
1992	0.018	−0.011	0.091	0.113	0.061	0.051
1993	0.034	−0.001	0.076	0.118	0.060	0.027
1994	0.035	−0.009	0.036	0.122	0.055	−0.004
1995	−0.017	−0.067	−0.050	0.060	−0.013	−0.103
1996	0.090	0.056	0.095	0.148	0.097	0.078
1997	−0.012	−0.050	−0.015	0.071	0.012	−0.049
1998	−0.014	−0.052	−0.041	0.061	0.004	−0.073
1999	−0.009	−0.032	−0.035	0.056	0.019	−0.059

The issue of the role which organized crime plays in market integration in Russia is not simple and needs special consideration. The next section discusses this issue, providing a conceptual framework for interpreting the empirical results.

5.2. Organized Crime and Prices

Publications in the Russian press during the years of transition provide countless examples of criminal activity affecting the realm of retail and wholesale trade. Generalizing, a number of lines of such activity may be

recognized that eventually impact sales prices. Classified by their economic consequences, these are pooled into the following clusters.

The first one includes racketeering retail and wholesale traders, or, as Berkowitz *et al*. (1998) gracefully write, collecting "extortion rent." Highway robberies as well as "tribute" for transporting goods along some section of a highway and/or for entry into a city also fall into the cluster. The economic consequence is an increase in the costs of inter- and intramarket trade (which is shifted to final prices). According to Radayev (1998), payoff to a criminal group for "protection" against other groups and individual racketeers — for so called *krysha* ("roof") — can total 10 – 15% of a businessman's income, but this may be more expensive, up to 1/3. On the other hand, prevention of racketeering raises costs as well because of the expenditures for protection and securing one's business.

Aiming to maintain their "extortion rent," criminal groups block commodity inflows from locations with lower prices (*e.g*., the fact is well-known that Moscow "mafia" did not let trucks with vegetables and fruits from southern regions into the city). This cluster also involves forcing those traders who bring goods to the city to sell these goods to criminal group (or to its "under-wardships") at knock-down prices; the goods are then sold in local markets at much higher prices. The economic consequence is restriction of arbitrage.

To maintain "extortion rent," criminal groups also force traders not to lower prices below a "prescribed" floor. In some cases, traders themselves order such actions, thus preventing their competitors from undercutting their prices. The economic consequence is the restriction of intra-market price competition.

The forth cluster relates to goods which come in very large lots. There is information that wholesale trade in gasoline (and, maybe, in sugar) is controlled by organized crime in some cities. "Shadow" monopoly (if virtual control belongs to one criminal group) or cartel collusion (if there are a few groups) enables prices for a good in a city to be synchronously raised, at the same time blocking the supply of this good through other channels. One more realm of machinations here is food purchases by local (regional) administrations at overstated prices. Such actions are carried out by corrupted officials in "co-operation" with criminal groups (most often, this concerns grain, large lots of which promise huge profits; clearly this results in high prices for the final goods produced from it, *e.g*., bread). The economic significance of this cluster is withdrawal — usually, with surplus — of the intermarket price difference; the consequence is a rise in local prices (which is not eliminated by arbitrage).

Hence organized crime objectively counteracts the integration of the Russian consumer market by both creating direct barriers to arbitrage and increasing arbitrage transaction costs, thus hindering the convergence of prices across regions. Therefore it should be expected that the higher the organized crime rate is in a region, the higher are prices there.

It needs to be noted, however, that there is one more cluster of criminal activity, the potential economic consequence of which has the opposite effect, that is, it facilitates competition and reduces prices. The case in hand is the illegal production of (surrogate) vodka and contraband import. To what extent might this change the conclusion drawn?

When fake vodka is produced on a large scale, it is delivered through legal channels.[5] Once entering into the trade network, this vodka is then distributed as any ordinary (legal) good, including to other regions as well (*e.g.*, it is known that "Absolut" vodka was not exported to Russia during a few years, nevertheless, it — clearly, fake — was sold all over the country).[6] In former times, illegal vodka was sold in retail trade at noticeably lower prices than the legal one. However, in the recent years, after control over the circulation of alcoholic products has been toughen, licensing for trade in alcohol has been introduced, and selling of vodka in kiosks has been prohibited, fake vodka is sold at the same prices as genuine vodka (in order not to attract the attention of law-enforcement and controlling bodies), and price competition with legal producers occurs almost only on the wholesale level.

In the case that illegal vodka is supplied by a producer (or by his middleman) directly to shops, he is interested not in increasing the quantity of sales in each shop due to lower retail prices but in entering additional retail enterprises since this provides a much higher rise in income. Nor do such shops have the stimuli for price competition as gains from an increase in sales is incomparably (by orders of value) less than the profit itself from substituting genuine vodka for fake vodka. It is not inconceivable that illegal vodka is supplied to a shop by one criminal group, but the "roof" is provided by another. However, even though such shops

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[5] Underground trade in surrogate vodka (at very low prices) belongs *predominantly* to the realm of "gray economy" rather than to that of organized crime. Usually this takes place in the situation in which elementary small-scale production is organized by individuals or small groups of "underground businessmen."

[6] Because of this, the repeat certification of alcoholic beverages, which is established in some regions, not only has protectionist aims but also seeks to keep fake vodka (both imported from other regions and domestically produced) from entering the market.

have some "privileges" from organized crime, others selling genuine vodka (or even fake vodka but delivered from another region so that a shop might be in ignorance of its origin) can experience the above-described criminal pressure. Hence the impact of organized crime on prices may be oppositely directed.[7] Although a priory the eventual "resultant" cannot be determined, it is felt that, most probably, the increase in prices is more than considerable.

Contraband import should reduce prices. But it is hardly probable that this effect could be localized on the level of a single region. For example, favorable substances of contraband in Russia are cigarettes (until 1999), alcoholic beverages, and consumer electronics. However, these goods are imported illegally in giant lots, and so, the goods are distributed throughout the entire country. Even if the lots are relatively small, their size, nevertheless, is usually too large for a single city (region), and the contraband goods are distributed throughout a number of neighboring regions. For example, contraband of mass consumption goods from China is monopolized in Novosibirsk by one criminal group. But Novosibirsk merely serves as a large terminal station for these goods which are then delivered to other Siberian regions (Tomilina, 2000). Most likely, contraband facilitates the reduction of prices on the level of the whole country rather than on that of single regions.

Thus, we would expect the coefficient on each variable representing organized crime to be positive (except, maybe, regressions of the price for vodka).

5.3. Empirical Results

The results on the impact of the potential culprits on price dispersion are presented for panels (cross-sectional results are reported if data are available only for a single year); being cumbersome, detailed estimates by year are not reported. Because some data for 1992 are lacking, this year is omitted from the panels. Table 11 summarizes the results on commodity aggregates, the baskets of 19 and 25 foods as well as spatial price indices for foodstuff and industrial goods. Estimates for individual goods are reported in the electronic version of the paper.

[7] It should be mentioned that the "positive" role of organized crime may escape the official statistics. For the statistical observation of the prices for vodka, 6 representatives are used: home vodka of ordinary quality (such as "Russkaya", "Moskovskaya"), that of higher quality (such as "Posol'skaya", "Pshenichnaya"), and imported vodka (such as "Finlandia", "Absolut"). If fake vodka bears other brands, a price registration misses it (to say nothing of underground sales).

Table 11. Impact of Various Factors on Costs of Goods Aggregates.

Variable	All regions	Excluding difficult-to-access regions	European Russia
Basket of 19 food goods, 1993 – 1996			
Income	0.184 (0.005)***	0.094 (0.005)***	0.103 (0.006)***
Distance	0.098 (0.002)***	0.064 (0.002)***	0.007 (0.002)***
Distribution costs	0.105 (0.006)***	0.046 (0.005)***	0.041 (0.006)***
Crime rate	0.081 (0.005)***	0.098 (0.004)***	0.049 (0.004)***
Economic power of crime	0.109 (0.005)***	0.088 (0.005)***	0.050 (0.005)***
Infrastructure	0.043 (0.013)***	−0.002 (0.011)	−0.001 (0.012)
Regional freight tariff	0.000 (0.002)	0.019 (0.001)***	0.009 (0.001)***
Price regulations	−0.010 (0.003)***	−0.000 (0.003)	−0.019 (0.003)***
Subsidy	−0.012 (0.003)***	−0.012 (0.003)***	−0.033 (0.004)***
Basket of 25 food goods, 1993 – 1999			
Income	0.169 (0.003)***	0.085 (0.003)***	0.095 (0.004)***
Distance	0.079 (0.002)***	0.046 (0.001)***	0.007 (0.002)***
Distribution costs	0.096 (0.004)***	0.044 (0.003)***	0.043 (0.004)***
Crime rate	0.043 (0.003)***	0.065 (0.003)***	0.023 (0.003)***
Economic power of crime	0.083 (0.003)***	0.064 (0.003)***	0.043 (0.003)***
Infrastructure	0.053 (0.008)***	−0.008 (0.007)	−0.019 (0.008)**

Continued from p. 54

Variable	All regions	Excluding difficult-to-access regions	European Russia
Basket of 25 food goods, 1993 – 1999			
Regional freight tariff	−0.003 (0.001)**	0.015 (0.001)***	0.009 (0.001)***
Price regulations	−0.014 (0.002)***	−0.004 (0.002)***	−0.017 (0.002)***
Subsidy	−0.016 (0.002)***	−0.014 (0.002)***	−0.028 (0.003)***
Spatial food price index, 1997 – 1998			
Income	0.161 (0.005)***	0.080 (0.003)***	0.095 (0.003)***
Distance	0.084 (0.002)***	0.053 (0.002)***	0.007 (0.001)***
Distribution costs	0.078 (0.004)***	0.032 (0.003)***	0.023 (0.003)***
Crime rate	−0.008 (0.004)**	0.012 (0.003)***	−0.004 (0.002)**
Economic power of crime	0.064 (0.004)***	0.038 (0.003)***	0.018 (0.003)***
Infrastructure	0.110 (0.011)***	0.041 (0.007)***	0.033 (0.006)***
Regional freight tariff	−0.010 (0.002)***	0.008 (0.001)***	0.005 (0.001)***
Price regulations	−0.007 (0.003)**	0.001 (0.002)	−0.008 (0.001)***
Subsidy	−0.001 (0.003)	−0.000 (0.002)	−0.007 (0.002)***
Spatial industrial goods price index, 1997 – 1998			
Income	0.111 (0.004)***	0.057 (0.003)***	0.030 (0.005)***
Distance	0.035 (0.002)***	0.019 (0.002)***	0.022 (0.003)***

Continued from p. 55

Variable	All regions	Excluding difficult-to-access regions	European Russia
Spatial industrial goods price index, 1997 – 1998			
Distribution costs	0.063 (0.004)***	0.029 (0.003)***	0.017 (0.005)***
Crime rate	−0.026 (0.004)***	−0.001 (0.003)	−0.004 (0.004)
Economic power of crime	0.070 (0.004)***	0.052 (0.004)***	0.033 (0.005)***
Infrastructure	0.062 (0.010)***	0.002 (0.009)	−0.067 (0.012)***
Regional freight tariff	0.005 (0.001)***	0.013 (0.001)***	0.009 (0.002)***
Shuttle trade	0.020 (0.003)***	0.014 (0.001)***	0.021 (0.002)***
Subsidy	−0.020 (0.003)***	−0.022 (0.003)***	−0.065 (0.004)***

Adding variables that are supposed to be responsible for market fragmentation, the dependence of the price differential on the income differential weakens. However, it very rarely becomes insignificant, and this occurs only when one deals with individual goods (on the other hand, β for them rises sometime). Hence, there are extra barriers fencing Russian regions off each other; such a result might be expected (also worthy of mention is a very rough approximation of a number of variables). Let us consider the results of specific variables, taking them in the same order as in Section 5.1.

Shipping conditions. Transportation infrastructure has mainly the expected positive sign, accounting for a sufficient share of price dispersion in many instances if the case in hand is all regions. The variable becomes insignificant in 3 cases out of 4 when difficult-to-access regions are eliminated. Dealing with European Russia, negative estimates appear; they are numerous for individual goods. A possible reason may be the poor approximation yielded by the index adopted. Referring to the composition of the infrastructure index described in Section 5.1, it is obvious that a lot of components are involved in the index which are irrelevant to the delivery of goods, but can cause a sufficient difference in the

variable value across regions. The relationship between price dispersion and regional freight tariff is positive (though not always).

State intervention in economy. Both variables unless insignificant always have a negative effect on price dispersion. Thus, price regulations and subsidies narrow inter-regional price gaps, so acting in favor of price convergence. For specific goods, the pattern is mixed. However, as for subsidies, the negative effect prevails, *e.g.*, taking place in 70% of the estimations for food goods.

Shuttle trade. Shuttle trade has a positive effect on the price difference on both the aggregated and disaggregated levels (the exception is provided by three goods, for all of which the estimates are cross-sectional rather than panel ones). Hence, this primitive form of trade has a paradoxical impact on market integration; the more intensive is the shuttle trade in a region, the higher prices are there. However, this is of no surprise if one takes into account that shuttle trade is, in fact, arbitrage between foreign countries and the region rather than between this region and other Russian regions. Because of the high trade costs, goods imported by "shuttles" push prices up. But this is not always the case.

Organized crime. As it follows from Table 11, organized crime is responsible for a significant share of price dispersion. Not infrequently, both proxies of organized crime are contemporarily significant. This corroborates the above stated assumption that these proxies describe two different dimensions of organized crime (however, they both indirectly characterize those lines of criminal activity that affect inter-regional price dispersion.) At the same time, the division of organized crime between two variables has a disadvantage that we have no information about the total impact of organized crime on market fragmentation. Therefore, some combined measure is desirable, which would join the crime rate and economic power of crime. The construction of a proper joint variable will be the subject of further work.

Referring to individual goods, both variables of organized crime are, too, contemporaneously significant in many instances. But there are cases of a negative relationship (though, they are present in Table 11 as well). With a sole exception, they occur when short panels of one to three recent years are dealt with. This provides some grounds to attribute the cases of negative sign to accidental reasons. As for the exception mentioned, there may be another story. The good under consideration is vodka, which has a negative relationship between the price differential, and one variable of organized crime, namely, the economic power of crime. It is not inconceivable that this fact is evidence of the decreasing

dispersion of prices for vodka under the impact of organized crime in 1993 – 1995.

The feature that is seen from the results for individual goods is that the dependence of price dispersion on organized crime weakens over the 1997 – 1999 panel as against the 1993 – 1995 panel. This reflects the temporal pattern of the organized crime effect. Not reported cross-sectional regressions by year provide evidence that the impact of crime is strengthening during the early years of transition, and then is decreasing. The maximum effect of crime on prices falls into the interval of approximately 1993 – 1995. Being estimated over the panel of price-25 in the same manner as for β (see Section 4.1), the trend factor is significant and negative for both variables. It ranges across region samples from −0.043 to −0.025 for the crime rate, and from −0.024 to −0.019 for the economic power of crime, European Russia having the lowest absolute values.

Such a finding seems to be rather surprising. However, analyzing the data of a number of sociological surveys, Radayev (1998) finds the same feature in the evolution of crime in Russia. He suggests the following reasons for narrowing the "realm of organized force": the ending of the era of "fast money", the division of spheres of influence, strengthening care (of crime and business which uses its "services") for own security, the shift of crime to "white" and "gray" market segments.[8] This does not mean that organized crime steps back; it just transforms itself, that is, the opposition of crime and business is changing to the interosculation.

Both the intuitive considerations in Section 5.2 and the empirical results above suggest that organized crime hinders market integration. But there is another result that seemingly conflicts with these results. Using the economic power of crime as a variable, Brown and Earle (2000) find organized crime to increase the positive effect of competition. In light of the observations on Russian reality, this seems quite astonishing. One could conclude herefrom that organized crime facilitates the reduction of market fragmentation. Is this really the case? Is Brown – Earle's finding in conflict with that of the current study, or can these be reconciled?

This paper considers consumer goods. Till the crisis of 1998, the production of most of these brought low profit (if any). Therefore criminal groups did not show interest in the usurpation of control over the production of such goods, preferring to act as parasites in the trade of

[8] "The time when risky money, big and fast, was made is over. Nowadays this is a routine, a complex and hard job; no superprofit is here, and where it lacks, extortioners do not intrude there", — cites Radayev (p. 60) his respondent.

these goods. Competitive, successfully working enterprises, control over which might provide high gains, were attractive for criminal groups. Such (again, till the 1998 crisis) were mostly enterprises that worked — directly or indirectly — for export. It was just such enterprises that were above all the subjects of organized crime intrusion[9] (the results of Brown and Earle, which had they been presented by sector, they could shed more light upon the issue of the direction of this intrusion; unfortunately, their paper reports only data aggregated over the entire industry).

Thus, even if organized crime facilitates competition, there are no grounds to anticipate its positive impact on the integration of the *consumer* market, as this is just corroborated by the use of Brown – Earle's measure for organized crime within the framework of this study. What is more, one hardly might expect that the effect found by them relates to the increase of price competition in the internal market at all.

Then what does their finding imply? As a dependent variable, Brown and Earle use the output an enterprise produced. The competition measure ("competitive pressure") of interest to us is an index reflecting the deconcentration degree of both inter- and intra-regional product markets. A positive relationship between these two variables means that the less concentrated the market is, the more productive are enterprises working in it. When the combined impact of competition and organized crime (being represented by the product of these variables) is taken into account, the relationship becomes considerably stronger. Brown and Earle explain this by the fact that criminal groups (controlling enterprises) can compete against one another, and that they can facilitate the delivery of goods, both by cutting through the bureaucratic red tape and by protecting the goods from robbers.

Possibly, this does occur, but the essentials seem to be other. First, the causality may be opposite, that is, organized crime does not facilitate the productivity of enterprise, but vice versa; the more successfully an enterprise works, the more attractive it is for criminal groups, and so, the more chances it has to fall under criminal control. Second, a criminal group, indeed, may facilitate the productivity of enterprise with its specific means: contraband export of production, escaping taxes, getting various preferences and/or overpriced purchase orders from corrupted officials, *etc.* Third, organized crime can increase the competition measure itself, in particular, by forming a great number of intermediary (though registered as manufacturing) firms "around" a controlled enterprise, these firms aiming to hide an enterprise's profit from taxation, to

[9] Probably, the situation changed after 1998. However, no information which could give an idea of evolution of "sectoral interests" of organized crime in recent years has been found.

launder capitals (portions of which is used for legal investments), to perform unlawful foreign-trade operations, *etc.*

Thus, counteraction to market integration and (seeming or real) strengthening of the positive effect of competition that are caused by the activity of organized crime do not at all contend against one another, but peacefully coexist; moreover, these intensify one another to a certain extent. And so, an increase in competition in the case in question (*i.e.*, in its "criminal part") does not in the least reduce the fragmentation of the Russian regional markets.

6. CONCLUSIONS

In this paper, an approach to examining market integration is proposed that consists of the analysis of the relationship between price dispersion and income differences across locations. Having been applied to diverse price data across Russian regions, the approach has proved its worth as a fruitful tool for analysis. Empirical findings accord well with the practical evidence. On the other hand, the obtained temporal pattern of Russian market integration roughly conforms, though not fully, with the pattern provided by the study of Berkowitz and DeJong (2001), who use quite another methodology. So, it may be argued that the strength of the price-income relationship is a good measure of internal market fragmentation.

On frequent occasions, even simple regressions of price on only income identifies indications of poor integration. Certainly, the lack of a relationship between price and income differences is not a sufficient condition for the fulfillment of the law of one price (like occurrence of the dependence of price dispersion on distance), but this is its necessary condition. Needless to say, it would be highly interesting and desirable to apply the proposed approach to some advanced market economies. First, it is intriguing how the methodology will work with a market which is a priori taken as integrated. Second, quantitative results would provide the reference point for transitional economies, primarily, for the Russian one.

Empirical results themselves suggest that it is premature to label the Russian economic space as "single." When natural impediments to market integration, such as distances and difficult-to-access territories, as well as differences in local distribution costs are controlled for, the pattern somewhat improves, but nonetheless it demonstrates that there are sufficient "artificial" barriers to inter-regional trade.

Alongside with these, indications of improvement in market integration can be seen. The fragmentation measure tends to decrease with time; the inter-regional barriers seem to become lower in recent years. This provides hope that the Russian internal market is moving towards integration. Unfortunately, the movement is slow and not steady.

APPENDICES

A. Distribution Costs of Retail Trade

Component of Costs	1993	1994	1995	1996	1997	1998
Percentage of retail sales						
Total	15.4	17.6	17.5	21.9	21.1	21.1*
Material costs	2.3	3.1	3.6	3.9	3.5	3.5
Among them: local shipping	NA	NA	NA	1.2	1.1	0.8
fuel and electricity	0.4	0.6	0.8	1.3	1.2	1.3
Wage and wage taxes	5.8	7.5	7.0	10.0	10.1	10.0
Among them: wage	4.6	5.5	5.4	7.4	7.5	7.4
wage taxes	1.2	2.0	1.6	2.6	2.7	2.6
Amortization	0.1	0.4	0.5	1.0	0.9	0.8
Other costs	7.3	6.6	6.3	6.9	6.5	6.8
Among them: rents	0.4	0.6	0.8	0.8	1.0	1.1
Percentage of total						
Total	100	100	100	100	100	100
Material costs	14.9	17.6	20.7	17.9	16.7	16.4
Among them: local shipping	NA	NA	NA	5.5	5.0	3.8
fuel and electricity	2.6	3.4	4.6	5.8	5.8	5.6
Wage and wage taxes	37.7	42.6	40.2	45.8	48.0	47.3
Among them: wage	29.9	31.2	31.0	33.9	35.4	35.1
wage taxes	7.8	11.4	9.2	11.9	12.6	12.2
Amortization	0.6	2.3	2.9	4.7	4.3	4.0
Other costs	47.4	37.5	36.2	31.6	31.0	32.2
Among them: rents	2.6	3.4	4.6	3.6	4.6	5.3

* The value for 1997 is used.

Sources: Goskomstat (1996b), p. 32; Goskomstat (1998d), p. 64; Goskomstat (1999d), p. 69.

B. Composition and Structure of the Baskets of 19 and 25 Basic Food Goods

No	Good	Unit of measure	Quantity, the 19-item basket	Quantity, the 25-item basket
1	Rye-and-wheat bread	kg	92	68.7
2	White bread	kg	86.7	62.9
3	Flour	kg	—	19.5
4	Rice	kg	—	3.7
5	Millet	kg	18.1	9.8
6	Vermicelli	kg	7.3	5.2
7	Potatoes	kg	146	124.2
8	Cabbages	kg	29.8	28.1
9	Carrots	kg	—	37.5
10	Onions	kg	10.2	28.4
11	Apples	kg	11	19.4
12	Sugar	kg	24.8	20.7
13	Beef	kg	42	8.4
14	Poultry-meat	kg	—	17.5
15	Boiled sausage	kg	2.2	0.45
16	Boiled-and-smoked sausage	kg	1.1	0.35
17	Frozen fish	kg	—	11.7
18	Milk	l	184.3	123.1
19	Sour cream	kg	4.2	1.6
20	Butter	kg	3.6	2.5
21	Curd	kg	—	9.9
22	Cheese	kg	2	2.3
23	Eggs	piece	183	151.4
24	Margarine	kg	—	3.9
25	Vegetable oil	kg	10	6.4
26	Cigarettes	pack	96	—

Source: Goskomstat (1998b), p. 428.

C. Retail-Wholesale Margin *vs.* Food Basket Costs

Table C1. The Role of Retail-Wholesale Margin in the Difference in Costs of the Food Baskets.

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1993:12	Income	0.214 (0.009)***	0.173 (0.009)***	0.147 (0.010)***	0.108 (0.009)***	0.061 (0.012)***	0.058 (0.012)***
	Distance	0.134 (0.005)***	0.111 (0.005)***	0.108 (0.005)***	0.090 (0.005)***	0.017 (0.006)***	0.026 (0.007)***
	RWM	0.065 (0.010)***	0.080 (0.011)***	0.042 (0.009)***	0.044 (0.010)***	0.020 (0.014)	−0.004 (0.016)
1994:12	Income	0.243 (0.009)***	0.239 (0.008)***	0.141 (0.008)***	0.140 (0.007)***	0.138 (0.009)***	0.134 (0.009)***
	Distance	0.119 (0.004)***	0.098 (0.004)***	0.084 (0.004)***	0.060 (0.004)***	0.017 (0.005)***	0.018 (0.005)***
	RWM	0.040 (0.009)***	0.056 (0.009)***	0.014 (0.008)*	0.026 (0.007)***	0.012 (0.008)	0.020 (0.008)**
1995:12	Income	0.143 (0.008)***	0.152 (0.007)***	0.078 (0.006)***	0.083 (0.006)***	0.082 (0.007)***	0.100 (0.006)***
	Distance	0.107 (0.004)***	0.109 (0.004)***	0.063 (0.004)***	0.067 (0.003)***	0.008 (0.005)*	0.008 (0.004)*
	RWM	0.053 (0.011)***	0.052 (0.011)***	0.005 (0.008)	0.005 (0.007)	−0.028 (0.007)***	−0.028 (0.006)***
1996:12	Income	0.154 (0.008)***	0.137 (0.007)***	0.064 (0.005)***	0.054 (0.005)***	0.083 (0.005)***	0.072 (0.005)***
	Distance	0.132 (0.004)***	0.124 (0.003)***	0.078 (0.003)***	0.075 (0.003)***	0.000 (0.003)	0.008 (0.003)***
	RWM	0.116 (0.008)***	0.121 (0.007)***	0.064 (0.006)***	0.080 (0.006)***	0.041 (0.006)***	0.045 (0.006)***
1997:12	Income	—	0.192 (0.008)***	—	0.084 (0.005)***	—	0.098 (0.006)***
	Distance	—	0.110 (0.003)***	—	0.063 (0.003)***	—	0.013 (0.003)***
	RWM	—	0.058 (0.006)***	—	0.025 (0.005)***	—	0.014 (0.005)***

Continued from p. 63

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1998:12	Income	—	0.124 (0.005)***	—	0.077 (0.005)***	—	0.077 (0.006)***
	Distance	—	0.056 (0.003)***	—	0.030 (0.003)***	—	−0.008 (0.004)**
	RWM	—	0.075 (0.005)***	—	0.048 (0.005)***	—	0.028 (0.007)***
1999:12	Income	—	0.149 (0.004)***	—	0.094 (0.004)***	—	0.109 (0.005)***
	Distance	—	0.064 (0.003)***	—	0.024 (0.002)***	—	−0.003 (0.003)
	RWM	—	0.073 (0.005)***	—	0.048 (0.004)***	—	0.039 (0.006)***
Panel	Income	0.178 (0.004)***	0.160 (0.003)***	0.097 (0.004)***	0.086 (0.002)***	0.086 (0.004)***	0.085 (0.003)***
	Distance	0.125 (0.002)***	0.097 (0.001)***	0.084 (0.002)***	0.059 (0.001)***	0.010 (0.002)***	0.009 (0.002)***
	RWM	0.070 (0.005)***	0.072 (0.003)***	0.030 (0.004)***	0.037 (0.003)***	0.007 (0.004)	0.018 (0.003)***

RWM — retail-wholesale margin.

Table C2. Impact of Income and Distance on "Wholesale" Cost of the Food Baskets.

Period	Variable	All regions		Excluding difficult-to-access regions		European Russia	
		Price-19	Price-25	Price-19	Price-25	Price-19	Price-25
1993:12	Income	0.136 (0.010)***	0.092 (0.010)***	0.096 (0.011)***	0.050 (0.011)***	0.088 (0.012)***	0.046 (0.013)***
	Distance	0.117 (0.005)***	0.100 (0.005)***	0.098 (0.005)***	0.084 (0.005)***	0.015 (0.006)**	0.020 (0.007)***
1994:12	Income	0.204 (0.007)***	0.201 (0.007)***	0.131 (0.008)***	0.131 (0.007)***	0.134 (0.010)***	0.144 (0.009)***
	Distance	0.101 (0.004)***	0.081 (0.004)***	0.072 (0.004)***	0.050 (0.004)***	0.014 (0.005)***	0.017 (0.005)***
1995:12	Income	0.122 (0.006)***	0.129 (0.006)***	0.073 (0.006)***	0.076 (0.006)***	0.070 (0.008)***	0.090 (0.008)***
	Distance	0.077 (0.003)***	0.078 (0.003)***	0.045 (0.004)***	0.047 (0.003)***	0.011 (0.005)**	0.009 (0.004)**
1996:12	Income	0.111 (0.007)***	0.101 (0.006)***	0.041 (0.006)***	0.032 (0.005)***	0.071 (0.007)***	0.060 (0.006)***
	Distance	0.083 (0.004)***	0.076 (0.003)***	0.054 (0.003)***	0.048 (0.003)***	0.005 (0.004)	0.009 (0.004)**
1997:12	Income	—	0.125 (0.007)***	—	0.046 (0.007)***	—	0.104 (0.009)***
	Distance	—	0.071 (0.003)***	—	0.043 (0.003)***	—	0.013 (0.005)***
1998:12	Income	—	0.075 (0.005)***	—	0.064 (0.006)***	—	0.085 (0.008)***
	Distance	—	0.030 (0.003)***	—	0.021 (0.003)***	—	0.000 (0.005)
1999:12	Income	—	0.089 (0.005)***	—	0.077 (0.006)***	—	0.114 (0.008)***
	Distance	—	0.046 (0.003)***	—	0.028 (0.003)***	—	0.009 (0.005)*
Panel	Income	0.141 (0.004)***	0.116 (0.003)***	0.081 (0.004)***	0.069 (0.003)***	0.084 (0.005)***	0.089 (0.003)***
	Distance	0.095 (0.002)***	0.069 (0.001)***	0.068 (0.002)***	0.046 (0.001)***	0.011 (0.003)***	0.011 (0.002)***

D. Retail-Wholesale Margin *vs.* Spatial Price Indices

Table D1. The Role of Retail-Wholesale Margin in Differences of Spatial Price Indices.

Sample/Variable		Foods		Industrial goods	
		1997:1	1998:1	1997:1	1998:1
Model with the retail-wholesale margin variable					
All regions	Income	0.133 (0.006)***	0.163 (0.006)***	0.097 (0.005)***	0.117 (0.005)***
	Distance	0.106 (0.003)***	0.089 (0.002)***	0.047 (0.002)***	0.039 (0.002)***
	RWM	0.083 (0.005)***	0.060 (0.005)***	0.062 (0.005)***	0.036 (0.005)***
Excluding difficult-to-access regions	Income	0.065 (0.003)***	0.081 (0.004)***	0.046 (0.004)***	0.070 (0.005)***
	Distance	0.067 (0.002)***	0.056 (0.002)***	0.022 (0.002)***	0.022 (0.002)***
	RWM	0.046 (0.004)***	0.030 (0.003)***	0.037 (0.004)***	0.018 (0.004)***
European Russia	Income	0.069 (0.003)***	0.087 (0.004)***	0.045 (0.006)***	0.060 (0.006)***
	Distance	0.009 (0.002)***	0.007 (0.002)***	0.028 (0.004)***	0.023 (0.004)***
	RWM	0.012 (0.004)***	0.005 (0.003)	0.034 (0.006)***	0.022 (0.006)***
Model with index cleared of retail-wholesale margin					
All regions	Income	0.080 (0.005)***	0.086 (0.005)***	0.038 (0.005)***	0.053 (0.005)***
	Distance	0.062 (0.003)***	0.049 (0.003)***	0.032 (0.003)***	0.029 (0.003)***
Excluding difficult-to-access regions	Income	0.032 (0.003)***	0.038 (0.006)***	0.018 (0.005)***	0.033 (0.006)***
	Distance	0.041 (0.003)***	0.029 (0.003)***	0.018 (0.003)***	0.020 (0.003)***
European Russia	Income	0.053 (0.005)***	0.092 (0.008)***	0.041 (0.006)***	0.079 (0.008)***
	Distance	0.006 (0.004)*	0.006 (0.004)	0.019 (0.005)***	0.017 (0.005)***

RWM — retail-wholesale margin.

E. Individual Food Goods

Table E1. Standard Deviations of Price Differentials of Individual Food Goods.

Good	1992	1993	1994	1995	1997	1998	1999
All regions (2701 observations)							
Beef	0.387	0.463	0.569	0.375	0.275	0.319	0.225
Milk	0.879	0.757	0.460	0.475	0.385	0.379	0.378
Eggs	0.463	0.397	0.288	0.329	0.259	0.292	0.258
Frozen fish	—	—	—	—	0.297	0.372	0.287
Sugar	0.484	0.178	0.221	0.222	0.206	0.280	0.176
Vegetable oil	0.552	0.452	0.544	0.407	—	0.293	0.168
Potatoes	0.596	0.677	0.550	0.395	0.424	0.425	0.295
White bread	0.661	0.633	0.482	0.511	0.359	0.381	0.285
Flour	—	—	—	—	—	0.339	0.222
Rice	—	—	—	—	—	0.257	0.173
Vermicelli	—	—	—	—	—	0.291	0.286
Butter	0.503	0.287	0.555	0.189	0.160	0.218	0.185
Boiled sausage	0.531	0.293	0.359	0.216	—	—	—
Vodka	0.409	0.298	0.357	0.350	—	—	—
Excluding difficult-to-access regions (2346 observations)							
Beef	0.341	0.374	0.440	0.288	0.189	0.253	0.161
Milk	0.859	0.731	0.514	0.446	0.315	0.313	0.310
Eggs	0.445	0.383	0.240	0.224	0.168	0.230	0.201
Frozen fish	—	—	—	—	0.282	0.362	0.259
Sugar	0.497	0.153	0.193	0.162	0.169	0.271	0.145
Vegetable oil	0.498	0.449	0.498	0.260	—	0.282	0.154
Potatoes	0.489	0.625	0.494	0.332	0.346	0.365	0.272
White bread	0.668	0.615	0.431	0.446	0.265	0.295	0.253
Flour	—	—	—	—	—	0.266	0.175
Rice	—	—	—	—	—	0.257	0.171
Vermicelli	—	—	—	—	—	0.242	0.267
Butter	0.506	0.389	0.561	0.170	0.138	0.207	0.164
Boiled sausage	0.527	0.211	0.292	0.180	—	—	—
Vodka	0.376	0.246	0.333	0.309	—	—	—

Continued from p. 67

Good	1992	1993	1994	1995	1997	1998	1999
European Russia (1275 observations)							
Beef	0.346	0.322	0.411	0.227	0.130	0.237	0.137
Milk	0.846	0.704	0.530	0.418	0.231	0.282	0.278
Eggs	0.419	0.381	0.234	0.168	0.095	0.231	0.139
Frozen fish	—	—	—	—	0.264	0.347	0.269
Sugar	0.449	0.125	0.186	0.129	0.113	0.294	0.125
Vegetable oil	0.479	0.435	0.460	0.224	—	0.290	0.148
Potatoes	0.484	0.606	0.434	0.331	0.295	0.365	0.220
White bread	0.674	0.610	0.373	0.457	0.243	0.284	0.251
Flour	—	—	—	—	—	0.249	0.187
Rice	—	—	—	—	—	0.280	0.128
Vermicelli	—	—	—	—	—	0.232	0.282
Butter	0.517	0.315	0.423	0.175	0.106	0.223	0.158
Boiled sausage	0.583	0.177	0.217	0.159	—	—	—
Vodka	0.401	0.235	0.316	0.302	—	—	—

Table E2. Impact of Income and Distance on Prices of Individual Food Goods.

Good	Variable	1992	1993	1994	1995	1997	1998	1999
All regions								
Beef	Income	0.275 (0.012)***	0.371 (0.014)***	0.350 (0.015)***	0.171 (0.009)***	0.131 (0.008)***	0.137 (0.007)***	0.135 (0.005)***
	Distance	0.041 (0.006)***	0.116 (0.006)***	0.144 (0.007)***	0.119 (0.005)***	0.119 (0.004)***	0.084 (0.004)***	0.076 (0.003)***
Milk	Income	0.214 (0.022)***	0.296 (0.023)***	0.261 (0.014)***	0.181 (0.011)***	0.223 (0.010)***	0.201 (0.009)***	0.195 (0.009)***
	Distance	0.053 (0.011)***	0.080 (0.010)***	0.085 (0.007)***	0.102 (0.006)***	0.185 (0.005)***	0.145 (0.005)***	0.120 (0.005)***
Eggs	Income	0.135 (0.013)***	0.085 (0.011)***	0.151 (0.008)***	0.126 (0.008)***	0.111 (0.008)***	0.099 (0.008)***	0.085 (0.006)***
	Distance	0.093 (0.006)***	0.076 (0.006)***	0.075 (0.004)***	0.137 (0.004)***	0.173 (0.005)***	0.124 (0.005)***	0.113 (0.004)***
Frozen fish	Income	—	—	—	—	0.056 (0.007)***	0.047 (0.009)***	0.051 (0.009)***
	Distance	—	—	—	—	0.096 (0.004)***	0.099 (0.005)***	0.059 (0.004)***

Continued from p. 68

Good	Variable	1992	1993	1994	1995	1997	1998	1999
All regions								
Sugar	Income	0.106 (0.012)***	0.068 (0.006)***	0.090 (0.007)***	0.089 (0.005)***	0.081 (0.005)***	0.062 (0.007)***	0.118 (0.005)***
	Distance	−0.012 (0.006)*	0.061 (0.003)***	0.117 (0.004)***	0.073 (0.003)***	0.109 (0.003)***	0.046 (0.004)***	0.057 (0.002)***
Vegetable oil	Income	0.040 (0.016)**	0.161 (0.011)***	0.258 (0.015)***	−0.080 (0.021)***	—	0.099 (0.006)***	0.083 (0.005)***
	Distance	0.083 (0.008)***	0.037 (0.006)***	0.203 (0.007)***	0.161 (0.008)***	—	0.061 (0.003)***	0.037 (0.002)***
Potatoes	Income	0.348 (0.017)***	0.329 (0.020)***	0.211 (0.012)***	0.153 (0.010)***	0.193 (0.010)***	0.154 (0.009)***	0.099 (0.006)***
	Distance	0.059 (0.007)***	0.124 (0.009)***	0.077 (0.006)***	0.088 (0.005)***	0.145 (0.005)***	0.077 (0.005)***	0.060 (0.003)***
White bread	Income	0.263 (0.019)***	0.152 (0.018)***	0.234 (0.013)***	0.174 (0.013)***	0.208 (0.010)***	0.224 (0.008)***	0.088 (0.006)***
	Distance	0.009 (0.008)	0.031 (0.009)***	0.093 (0.006)***	0.054 (0.007)***	0.098 (0.005)***	0.080 (0.005)***	0.053 (0.003)***
Flour	Income	—	—	—	—	—	0.215 (0.007)***	0.135 (0.005)***
	Distance	—	—	—	—	—	0.095 (0.004)***	0.047 (0.003)***
Rice	Income	—	—	—	—	—	0.060 (0.007)***	0.058 (0.005)***
	Distance	—	—	—	—	—	−0.000 (0.003)	0.059 (0.003)***
Vermicelli	Income	—	—	—	—	—	0.209 (0.007)***	0.144 (0.008)***
	Distance	—	—	—	—	—	0.084 (0.004)***	0.036 (0.004)***
Butter	Income	0.094 (0.014)***	0.055 (0.009)***	−0.025 (0.015)	0.070 (0.005)***	0.075 (0.004)***	0.093 (0.005)***	0.124 (0.005)***
	Distance	0.018 (0.007)**	0.043 (0.005)***	0.001 (0.008)	0.066 (0.003)***	0.071 (0.002)***	0.039 (0.003)***	0.037 (0.002)***
Boiled sausage	Income	0.347 (0.027)***	0.242 (0.010)***	0.237 (0.009)***	0.090 (0.006)***	—	—	—
	Distance	−0.007 (0.012)	0.142 (0.005)***	0.134 (0.004)***	0.090 (0.003)***	—	—	—
Vodka	Income	0.075 (0.014)***	0.228 (0.011)***	0.227 (0.010)***	0.123 (0.007)***	—	—	—
	Distance	0.073 (0.006)***	0.107 (0.005)***	0.094 (0.005)***	0.073 (0.004)***	—	—	—

Continued from p.69

Good	Variable	1992	1993	1994	1995	1997	1998	1999
Excluding difficult-to-access regions								
Beef	Income	0.188 (0.013)***	0.216 (0.013)***	0.187 (0.013)***	0.091 (0.007)***	0.054 (0.005)***	0.073 (0.006)***	0.100 (0.005)***
	Distance	0.000 (0.006)	0.062 (0.006)***	0.076 (0.007)***	0.055 (0.004)***	0.051 (0.003)***	0.028 (0.004)***	0.029 (0.002)***
Milk	Income	0.271 (0.027)***	0.234 (0.026)***	0.160 (0.015)***	0.119 (0.011)***	0.138 (0.009)***	0.118 (0.008)***	0.135 (0.010)***
	Distance	0.055 (0.013)***	0.059 (0.011)***	0.041 (0.008)***	0.075 (0.007)***	0.125 (0.005)***	0.084 (0.005)***	0.056 (0.005)***
Eggs	Income	0.109 (0.016)***	0.015 (0.012)	0.060 (0.007)***	0.028 (0.005)***	0.031 (0.005)***	0.017 (0.007)**	0.036 (0.005)***
	Distance	0.086 (0.008)***	0.046 (0.006)***	0.036 (0.004)***	0.069 (0.003)***	0.099 (0.004)***	0.054 (0.004)***	0.061 (0.003)***
Frozen fish	Income	—	—	—	—	0.100 (0.008)***	0.080 (0.010)***	0.118 (0.009)***
	Distance	—	—	—	—	0.091 (0.004)***	0.085 (0.005)***	0.024 (0.004)***
Sugar	Income	0.132 (0.016)***	0.028 (0.006)***	0.060 (0.007)***	0.029 (0.004)***	0.033 (0.004)***	0.035 (0.009)***	0.085 (0.005)***
	Distance	−0.004 (0.008)	0.057 (0.003)***	0.108 (0.004)***	0.034 (0.002)***	0.084 (0.003)***	0.028 (0.004)***	0.032 (0.002)***
Vegetable oil	Income	0.157 (0.017)***	0.164 (0.014)***	0.171 (0.015)***	0.063 (0.007)***	—	0.077 (0.007)***	0.069 (0.006)***
	Distance	0.064 (0.008)***	0.046 (0.007)***	0.179 (0.008)***	0.100 (0.004)***	—	0.050 (0.004)***	0.020 (0.002)***
Potatoes	Income	0.163 (0.016)***	0.195 (0.021)***	0.129 (0.013)***	0.046 (0.008)***	0.095 (0.008)***	0.084 (0.009)***	0.086 (0.008)***
	Distance	0.006 (0.006)	0.094 (0.009)***	0.050 (0.007)***	0.021 (0.005)***	0.077 (0.005)***	0.031 (0.005)***	0.056 (0.004)***
White bread	Income	0.412 (0.025)***	0.227 (0.022)***	0.136 (0.013)***	0.101 (0.011)***	0.114 (0.007)***	0.139 (0.007)***	0.053 (0.006)***
	Distance	0.008 (0.009)	0.007 (0.010)	0.062 (0.006)***	0.022 (0.007)***	0.030 (0.003)***	0.020 (0.004)***	0.031 (0.004)***
Flour	Income	—	—	—	—	—	0.150 (0.007)***	0.105 (0.006)***
	Distance	—	—	—	—	—	0.041 (0.004)***	0.013 (0.002)***
Rice	Income	—	—	—	—	—	0.068 (0.008)***	0.075 (0.006)***
	Distance	—	—	—	—	—	0.008 (0.004)*	0.064 (0.003)***

Continued from p.70

Good	Variable	1992	1993	1994	1995	1997	1998	1999
Excluding difficult-to-access regions								
Vermicelli	Income	—	—	—	—	—	0.150 (0.008)***	0.107 (0.009)***
	Distance	—	—	—	—	—	0.037 (0.004)***	0.002 (0.004)
Butter	Income	0.136 (0.018)***	0.007 (0.010)	−0.025 (0.021)	0.041 (0.005)***	0.041 (0.004)***	0.071 (0.005)***	0.106 (0.006)***
	Distance	0.032 (0.009)***	0.032 (0.006)***	0.018 (0.011)	0.050 (0.003)***	0.049 (0.002)***	0.021 (0.003)***	0.015 (0.002)***
Boiled sausage	Income	0.444 (0.038)***	0.106 (0.008)***	0.146 (0.009)***	0.032 (0.005)***	—	—	—
	Distance	−0.030 (0.013)**	0.084 (0.004)***	0.092 (0.005)***	0.049 (0.003)***	—	—	—
Vodka	Income	−0.043 (0.015)***	0.113 (0.010)***	0.181 (0.011)***	0.081 (0.007)***	—	—	—
	Distance	0.031 (0.006)***	0.050 (0.004)***	0.070 (0.005)***	0.049 (0.005)***	—	—	—
European Russia								
Beef	Income	0.164 (0.022)***	0.110 (0.019)***	0.214 (0.020)***	0.079 (0.008)***	0.041 (0.005)***	0.077 (0.008)***	0.118 (0.005)***
	Distance	0.002 (0.010)	0.029 (0.009)***	0.098 (0.010)***	0.005 (0.005)	0.013 (0.003)***	0.010 (0.007)	0.014 (0.003)***
Milk	Income	0.250 (0.049)***	0.191 (0.040)***	0.146 (0.025)***	0.107 (0.015)***	0.099 (0.009)***	0.094 (0.010)***	0.146 (0.014)***
	Distance	0.084 (0.022)***	0.051 (0.019)***	0.057 (0.014)***	0.007 (0.010)	0.029 (0.006)***	0.044 (0.007)***	0.013 (0.007)*
Eggs	Income	0.034 (0.029)	−0.037 (0.019)*	0.045 (0.011)***	0.006 (0.005)	0.006 (0.003)*	0.008 (0.010)	0.025 (0.006)***
	Distance	0.060 (0.012)***	0.063 (0.011)***	0.037 (0.007)***	0.020 (0.005)***	0.006 (0.002)***	0.019 (0.009)**	0.002 (0.004)
Frozen fish	Income	—	—	—	—	0.145 (0.011)***	0.122 (0.013)***	0.177 (0.010)***
	Distance	—	—	—	—	0.051 (0.008)***	0.061 (0.010)***	0.029 (0.007)***
Sugar	Income	0.150 (0.028)***	−0.003 (0.006)	0.022 (0.008)***	0.015 (0.005)***	0.035 (0.004)***	0.028 (0.013)**	0.103 (0.006)***
	Distance	−0.016 (0.013)	0.019 (0.004)***	0.049 (0.005)***	0.007 (0.004)*	0.024 (0.003)***	0.040 (0.011)***	−0.001 (0.003)

Continued from p.71

Good	Variable	1992	1993	1994	1995	1997	1998	1999
European Russia								
Vegetable oil	Income	0.127 (0.028)***	0.082 (0.022)***	0.124 (0.020)***	0.043 (0.007)***	—	0.065 (0.010)***	0.091 (0.008)***
	Distance	0.024 (0.015)	0.108 (0.012)***	0.130 (0.013)***	0.039 (0.006)***	—	0.054 (0.008)***	0.004 (0.004)
Potatoes	Income	0.135 (0.029)***	0.186 (0.032)***	0.101 (0.019)***	0.039 (0.013)***	0.059 (0.010)***	0.102 (0.013)***	0.096 (0.009)***
	Distance	0.033 (0.011)***	0.128 (0.015)***	0.083 (0.011)***	0.064 (0.009)***	0.099 (0.008)***	0.083 (0.010)***	0.032 (0.005)***
White bread	Income	0.388 (0.041)***	0.240 (0.034)***	0.142 (0.018)***	0.093 (0.015)***	0.122 (0.009)***	0.140 (0.010)***	0.035 (0.008)***
	Distance	0.158 (0.017)***	−0.034 (0.017)**	0.000 (0.010)	0.052 (0.013)***	0.017 (0.007)**	0.030 (0.007)***	0.063 (0.007)***
Flour	Income	—	—	—	—	—	0.182 (0.009)***	0.141 (0.008)***
	Distance	—	—	—	—	—	0.025 (0.006)***	0.030 (0.004)***
Rice	Income	—	—	—	—	—	0.067 (0.012)***	0.118 (0.006)***
	Distance	—	—	—	—	—	0.054 (0.009)***	0.003 (0.003)
Vermicelli	Income	—	—	—	—	—	0.148 (0.011)***	0.000 (0.000)***
	Distance	—	—	—	—	—	−0.003 (0.006)	0.000 (0.000)***
Butter	Income	0.080 (0.032)***	−0.010 (0.017)	0.059 (0.021)***	0.042 (0.006)***	0.027 (0.004)***	0.084 (0.008)***	0.131 (0.008)***
	Distance	−0.029 (0.015)*	0.022 (0.011)**	−0.014 (0.013)	0.018 (0.005)***	0.012 (0.003)***	0.035 (0.007)***	−0.009 (0.004)**
Boiled sausage	Income	0.958 (0.089)***	0.028 (0.009)***	0.168 (0.010)***	0.038 (0.006)***	—	—	—
	Distance	−0.113 (0.024)***	0.011 (0.005)**	0.022 (0.005)***	0.002 (0.004)	—	—	—
Vodka	Income	−0.165 (0.028)***	0.059 (0.014)***	0.210 (0.016)***	0.085 (0.010)***	—	—	—
	Distance	0.035 (0.012)***	0.027 (0.007)***	0.060 (0.010)***	0.062 (0.008)***	—	—	—

F. Individual Industrial Goods

Table F1. Standard Deviations of Price Differentials of Individual Industrial Goods.

Good	1997	1998	1999
All regions (2701 observations)			
Men's trousers	—	0.283	0.338
Shirts	0.296	0.321	0.329
Women's blouses	—	0.290	0.301
Skirts	—	0.361	0.346
Jumpers, sweaters	0.282	0.282	0.341
Gasoline	0.189	0.202	0.161
Children's jackets	0.309	—	—
Children's boots	0.258	—	—
Filter cigarettes	0.191	—	—
Excluding difficult-to-access regions (2346 observations)			
Men's trousers	—	0.274	0.318
Shirts	0.282	0.310	0.313
Women's blouses	—	0.294	0.302
Skirts	—	0.362	0.332
Jumpers, sweaters	0.268	0.274	0.340
Gasoline	0.140	0.142	0.137
Children's jackets	0.296	—	—
Children's boots	0.255	—	—
Filter cigarettes	0.183	—	—
European Russia (1275 observations)			
Men's trousers	—	0.269	0.309
Shirts	0.306	0.313	0.301
Women's blouses	—	0.312	0.322
Skirts	—	0.383	0.351
Jumpers, sweaters	0.286	0.285	0.312
Gasoline	0.112	0.129	0.147
Children's jackets	0.246	—	—
Children's boots	0.253	—	—
Filter cigarettes	0.167	—	—

Table F2. Impact of Income and Distance on Prices of Individual Industrial Goods.

Good	Variable	1997	1998	1999
All regions				
Men's trousers	Income	—	0.088 (0.009)***	0.183 (0.010)***
	Distance	—	0.020 (0.004)***	0.014 (0.005)***
Shirts	Income	0.007 (0.011)	0.045 (0.009)***	0.124 (0.009)***
	Distance	0.051 (0.004)***	0.050 (0.004)***	0.050 (0.005)***
Women's blouses	Income	—	0.089 (0.007)***	0.173 (0.007)***
	Distance	—	0.009 (0.004)**	−0.006 (0.004)*
Skirts	Income	—	0.095 (0.009)***	0.210 (0.011)***
	Distance	—	−0.014 (0.005)***	0.004 (0.005)
Jumpers, sweaters	Income	0.038 (0.010)***	0.072 (0.009)***	0.128 (0.010)***
	Distance	0.072 (0.004)***	0.067 (0.004)***	0.071 (0.005)***
Gasoline	Income	0.075 (0.005)***	0.097 (0.005)***	0.036 (0.004)***
	Distance	0.075 (0.003)***	0.073 (0.003)***	0.031 (0.002)***
Children's jackets	Income	0.085 (0.007)***	—	—
	Distance	0.029 (0.004)***	—	—
Children's boots	Income	0.053 (0.010)***	—	—
	Distance	0.039 (0.004)***	—	—
Filter cigarettes	Income	0.028 (0.005)***	—	—
	Distance	0.045 (0.003)***	—	—

Continued from p.74

Good	Variable	1997	1998	1999
Excluding difficult-to-access regions				
Men's trousers	Income	—	0.075 (0.010)***	0.178 (0.012)***
	Distance	—	0.017 (0.004)***	0.001 (0.005)
Shirts	Income	−0.040 (0.012)***	0.022 (0.010)**	0.109 (0.011)***
	Distance	0.032 (0.004)***	0.038 (0.005)***	0.026 (0.005)***
Women's blouses	Income	—	0.089 (0.008)***	0.185 (0.009)***
	Distance	—	0.015 (0.005)***	0.002 (0.004)
Skirts	Income	—	0.087 (0.011)***	0.196 (0.013)***
	Distance	—	−0.013 (0.005)**	−0.006 (0.005)
Jumpers, sweaters	Income	−0.009 (0.011)	0.040 (0.010)***	0.126 (0.011)***
	Distance	0.047 (0.004)***	0.049 (0.005)***	0.064 (0.005)***
Gasoline	Income	0.020 (0.003)***	0.036 (0.004)***	−0.002 (0.004)
	Distance	0.036 (0.002)***	0.022 (0.002)***	0.000 (0.002)
Children's jackets	Income	0.067 (0.008)***	—	—
	Distance	0.030 (0.004)***	—	—
Children's boots	Income	0.022 (0.011)**	—	—
	Distance	0.023 (0.004)***	—	—
Filter cigarettes	Income	0.002 (0.005)	—	—
	Distance	0.033 (0.003)***	—	—

Continued from p.75

Good	Variable	1997	1998	1999
European Russia				
Men's trousers	Income	—	0.077 (0.015)***	0.229 (0.016)***
	Distance	—	0.009 (0.008)	—0.012 (0.008)
Shirts	Income	−0.077 (0.018)***	0.000 (0.014)	0.134 (0.015)***
	Distance	0.078 (0.011)***	0.073 (0.011)***	0.029 (0.009)***
Women's blouses	Income	—	0.086 (0.011)***	0.236 (0.011)***
	Distance	—	−0.001 (0.008)	0.005 (0.008)
Skirts	Income	—	0.099 (0.016)***	0.278 (0.017)***
	Distance	—	0.011 (0.011)	−0.002 (0.009)
Jumpers, sweaters	Income	−0.071 (0.016)***	0.004 (0.015)	0.155 (0.016)***
	Distance	0.060 (0.009)***	0.030 (0.010)***	0.012 (0.009)
Gasoline	Income	0.020 (0.004)***	0.048 (0.005)***	0.009 (0.006)
	Distance	0.016 (0.003)***	0.003 (0.004)	0.000 (0.005)
Children's jackets	Income	0.032 (0.007)***	—	—
	Distance	0.010 (0.006)	—	—
Children's boots	Income	—0.075 (0.015)***	—	—
	Distance	0.018 (0.008)**	—	—
Filter cigarettes	Income	—0.036 (0.006)***	—	—
	Distance	0.009 (0.005)	—	—

G. Prices *vs*. Various Factors

Table G1. Impact of Various Factors on Prices of Individual Food Goods.

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Beef						
Income	0.243 (0.009)***	0.124 (0.005)***	0.105 (0.008)***	0.065 (0.004)***	0.085 (0.012)***	0.067 (0.006)***
Distance	0.106 (0.004)***	0.083 (0.002)***	0.048 (0.003)***	0.033 (0.002)***	0.031 (0.005)***	0.016 (0.003)***
Distribution costs	0.080 (0.011)***	0.070 (0.005)***	−0.045 (0.010)***	0.008 (0.005)*	−0.090 (0.014)***	0.004 (0.006)
Crime rate	0.120 (0.009)***	−0.015 (0.005)***	0.159 (0.008)***	0.009 (0.005)*	0.129 (0.010)***	−0.027 (0.006)***
Crime power	0.089 (0.009)***	0.085 (0.009)***	0.063 (0.008)***	0.048 (0.005)***	−0.000 (0.011)	0.010 (0.006)
Infrastructure	−0.027 (0.023)	−0.002 (0.013)	−0.063 (0.020)***	−0.087 (0.011)***	−0.003 (0.027)	−0.044 (0.014)***
Regional shipping	−0.008 (0.003)***	−0.015 (0.002)***	0.019 (0.003)***	0.003 (0.002)	0.012 (0.003)***	−0.006 (0.002)***
Price regulation	−0.001 (0.005)	−0.017 (0.003)***	0.017 (0.004)***	0.021 (0.002)***	−0.002 (0.005)	0.014 (0.003)***
Subsidy	0.028 (0.006)***	0.012 (0.004)***	0.022 (0.006)***	−0.002 (0.003)	−0.002 (0.008)	−0.037 (0.005)***
Milk						
Income	0.217 (0.011)***	0.201 (0.006)***	0.135 (0.013)***	0.139 (0.006)***	0.167 (0.020)***	0.132 (0.008)***
Distance	0.063 (0.005)***	0.112 (0.003)***	0.032 (0.005)***	0.067 (0.003)***	0.028 (0.009)***	0.026 (0.004)***
Distribution costs	0.003 (0.014)	0.224 (0.007)***	0.003 (0.015)	0.170 (0.007)***	0.016 (0.025)	0.133 (0.008)***
Crime rate	0.292 (0.013)***	−0.032 (0.007)***	0.295 (0.014)***	−0.012 (0.006)*	0.215 (0.017)***	−0.072 (0.007)***
Crime power	0.079 (0.013)***	0.178 (0.007)***	0.062 (0.013)***	0.142 (0.007)***	0.023 (0.017)***	0.090 (0.008)***

Continued from p.77

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Milk						
Infrastructure	0.078 (0.031)***	0.022 (0.016)	0.001 (0.033)	−0.037 (0.015)**	0.095 (0.045)**	−0.088 (0.018)***
Regional shipping	−0.008 (0.004)**	−0.000 (0.002)	0.008 (0.004)*	0.019 (0.002)***	−0.007 (0.005)	0.011 (0.002)***
Price regulation	0.018 (0.008)**	−0.029 (0.004)***	0.043 (0.008)***	0.005 (0.003)	0.022 (0.011)**	0.000 (0.004)
Subsidy	−0.071 (0.009)***	0.035 (0.005)***	−0.078 (0.009)***	0.020 (0.005)***	−0.093 (0.014)***	−0.021 (0.006)***
Eggs						
Income	0.091 (0.006)***	0.102 (0.005)***	−0.004 (0.006)	0.027 (0.004)***	−0.057 (0.010)***	−0.016 (0.007)**
Distance	0.088 (0.003)***	0.121 (0.003)***	0.048 (0.003)***	0.065 (0.002)***	0.036 (0.005)***	0.008 (0.003)**
Distribution costs	0.082 (0.009)***	0.095 (0.006)***	0.005 (0.008)	0.017 (0.005)***	0.023 (0.012)*	−0.000 (0.007)
Crime rate	0.025 (0.008)***	−0.008 (0.006)	0.051 (0.007)***	0.031 (0.005)***	0.034 (0.010)***	0.001 (0.005)
Crime power	0.113 (0.008)***	0.096 (0.006)***	0.099 (0.007)***	0.061 (0.005)***	0.091 (0.009)***	0.027 (0.007)***
Infrastructure	−0.013 (0.018)	0.022 (0.014)	−0.052 (0.017)***	−0.060 (0.012)***	−0.157 (0.024)***	−0.143 (0.015)***
Regional shipping	−0.016 (0.002)***	−0.019 (0.002)***	0.008 (0.002)***	0.003 (0.002)**	0.001 (0.003)	−0.007 (0.002)***
Price regulation	−0.007 (0.004)*	0.005 (0.004)	0.012 (0.004)***	0.035 (0.003)***	−0.002 (0.005)	0.023 (0.003)***
Subsidy	−0.020 (0.005)***	0.013 (0.004)***	−0.035 (0.005)***	0.008 (0.004)**	−0.051 (0.007)***	−0.022 (0.005)***
Frozen fish						
Income		0.052 (0.005)***		0.074 (0.006)***		0.059 (0.009)***
Distance		0.064 (0.003)***		0.050 (0.003)***		0.038 (0.005)***

Continued from p.78

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Frozen fish						
Distribution costs		−0.078 (0.007)***		−0.060 (0.007)***		−0.111 (0.012)***
Crime rate		−0.017 (0.006)***		−0.031 (0.007)***		0.011 (0.009)
Crime power	—	−0.045 (0.007)***	—	−0.033 (0.007)***	—	−0.019 (0.010)*
Infrastructure		−0.182 (0.015)***		−0.146 (0.015)***		−0.236 (0.022)***
Regional shipping		−0.003 (0.002)		−0.009 (0.002)***		−0.009 (0.003)***
Price regulation		0.005 (0.004)		−0.013 (0.004)***		−0.005 (0.006)
Subsidy		−0.021 (0.005)***		−0.003 (0.006)		0.065 (0.009)***
Sugar						
Income	0.078 (0.004)***	0.100 (0.004)***	0.033 (0.004)***	0.066 (0.005)***	0.007 (0.005)	0.047 (0.009)***
Distance	0.064 (0.002)***	0.058 (0.002)***	0.046 (0.002)***	0.042 (0.002)***	0.024 (0.003)***	0.026 (0.004)***
Distribution costs	0.053 (0.005)***	0.058 (0.005)***	0.051 (0.005)***	0.033 (0.005)***	0.035 (0.006)***	0.002 (0.009)
Crime rate	0.042 (0.005)***	−0.048 (0.005)***	0.054 (0.004)***	−0.030 (0.005)***	0.033 (0.005)***	−0.048 (0.007)***
Crime power	0.039 (0.004)***	0.024 (0.005)***	0.034 (0.004)***	0.016 (0.006)***	0.036 (0.004)***	0.006 (0.009)
Infrastructure	0.098 (0.012)***	0.102 (0.013)***	0.051 (0.011)***	0.053 (0.014)***	−0.018 (0.012)	−0.024 (0.021)
Regional shipping	−0.007 (0.002)***	−0.011 (0.002)***	0.004 (0.001)***	−0.005 (0.002)***	−0.004 (0.002)**	−0.013 (0.002)***
Price regulation	−0.015 (0.003)***	0.007 (0.002)***	−0.012 (0.002)***	0.012 (0.003)***	−0.005 (0.003)**	0.025 (0.004)***
Subsidy	−0.010 (0.003)***	−0.010 (0.003)***	−0.010 (0.003)***	−0.008 (0.003)**	−0.022 (0.004)***	−0.016 (0.006)***

Continued from p.79

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Vegetable oil (1998 – 1999 in columns "1997 – 1999")						
Income	0.155 (0.009)***	0.095 (0.005)***	0.107 (0.009)***	0.076 (0.006)***	0.086 (0.014)***	0.063 (0.009)***
Distance	0.085 (0.004)***	0.038 (0.002)***	0.080 (0.004)***	0.029 (0.003)***	0.072 (0.007)***	0.043 (0.005)***
Distribution costs	0.031 (0.011)***	0.025 (0.006)***	−0.013 (0.011)	0.009 (0.006)	−0.035 (0.015)**	0.009 (0.010)
Crime rate	0.178 (0.010)***	0.025 (0.006)***	0.205 (0.010)***	0.028 (0.006)***	0.166 (0.013)***	−0.019 (0.009)**
Crime power	0.091 (0.010)***	0.057 (0.006)***	0.093 (0.010)***	0.044 (0.007)***	0.089 (0.012)***	0.038 (0.010)***
Infrastructure	0.117 (0.024)***	0.010 (0.014)	0.089 (0.023)***	−0.022 (0.015)	0.078 (0.031)**	−0.094 (0.022)***
Regional shipping	0.002 (0.003)	0.008 (0.002)***	0.004 (0.003)	0.010 (0.002)***	0.001 (0.004)	−0.002 (0.003)
Price regulation	0.020 (0.005)***	0.013 (0.003)***	0.020 (0.005)***	0.022 (0.004)***	0.013 (0.006)**	0.036 (0.005)***
Subsidy	−0.053 (0.007)***	0.002 (0.004)	−0.061 (0.007)***	−0.005 (0.004)	−0.052 (0.009)***	−0.025 (0.008)***
Potatoes						
Income	0.179 (0.011)***	0.141 (0.006)***	0.089 (0.011)***	0.089 (0.006)***	0.111 (0.017)***	0.095 (0.008)***
Distance	0.082 (0.004)***	0.085 (0.003)***	0.050 (0.005)***	0.054 (0.003)***	0.101 (0.008)***	0.061 (0.005)***
Distribution costs	0.138 (0.014)***	0.157 (0.008)***	0.042 (0.014)***	0.104 (0.008)***	0.021 (0.020)	0.107 (0.010)***
Crime rate	0.099 (0.012)***	−0.057 (0.008)***	0.123 (0.011)***	−0.049 (0.007)***	0.060 (0.015)***	−0.095 (0.009)***
Crime power	0.103 (0.012)***	0.119 (0.008)***	0.089 (0.011)***	0.099 (0.007)***	0.045 (0.014)***	0.079 (0.009)***
Infrastructure	−0.023 (0.029)	−0.053 (0.018)***	−0.014 (0.028)	−0.105 (0.017)***	0.045 (0.039)	−0.048 (0.020)**

Continued from p.80

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Potatoes						
Regional shipping	−0.003 (0.004)	−0.028 (0.003)***	0.010 (0.004)**	−0.017 (0.002)***	0.005 (0.004)	−0.010 (0.003)***
Price regulation	0.010 (0.007)	−0.008 (0.004)*	0.004 (0.007)	−0.003 (0.004)	−0.016 (0.009)*	−0.024 (0.005)***
Subsidy	−0.065 (0.009)***	0.008 (0.006)	−0.047 (0.009)***	0.015 (0.006)***	−0.089 (0.013)***	−0.028 (0.008)***
White bread						
Income	0.195 (0.011)***	0.201 (0.006)***	0.148 (0.011)***	0.129 (0.005)***	0.147 (0.018)***	0.132 (0.009)***
Distance	0.042 (0.005)***	0.052 (0.003)***	0.002 (0.005)	0.012 (0.002)***	−0.008 (0.009)	0.025 (0.004)**
Distribution costs	−0.029 (0.015)*	0.034 (0.006)***	−0.045 (0.014)***	−0.017 (0.006)***	−0.060 (0.023)***	0.003 (0.009)
Crime rate	0.143 (0.012)***	0.035 (0.006)***	0.168 (0.011)***	0.088 (0.006)***	0.122 (0.015)***	0.070 (0.007)***
Crime power	−0.012 (0.011)	−0.007 (0.006)	−0.014 (0.011)	−0.033 (0.006)***	−0.025 (0.014)*	−0.039 (0.008)***
Infrastructure	0.125 (0.029)***	0.211 (0.015)***	0.089 (0.030)***	0.088 (0.014)***	0.069 (0.040)*	0.064 (0.020)***
Regional shipping	0.008 (0.004)*	−0.021 (0.002)***	0.021 (0.004)***	−0.004 (0.002)**	0.000 (0.005)	−0.003 (0.003)
Price regulation	0.067 (0.007)***	−0.007 (0.004)*	0.081 (0.008)***	0.015 (0.003)***	0.073 (0.011)***	−0.000 (0.004)
Subsidy	−0.076 (0.008)***	0.025 (0.005)***	−0.077 (0.008)***	0.011 (0.004)***	−0.076 (0.012)***	0.035 (0.007)***
Flour, 1998 – 1999						
Income		0.134 (0.005)***		0.086 (0.005)***		0.111 (0.008)***
Distance		0.066 (0.003)***		0.027 (0.002)***		0.026 (0.004)***
Distribution costs		0.108 (0.007)***		0.054 (0.006)***		0.055 (0.008)***

Continued from p.81

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Flour, 1998 – 1999						
Crime rate		0.011 (0.006)*		0.030 (0.006)***		0.017 (0.007)**
Crime power	—	0.061 (0.007)***	—	0.032 (0.006)***	—	0.017 (0.008)**
Infrastructure		−0.175 (0.015)***		−0.244 (0.013)***		−0.238 (0.018)***
Regional shipping		0.005 (0.002)**		0.018 (0.002)***		0.013 (0.002)***
Price regulation		−0.032 (0.004)***		−0.003 (0.003)		−0.013 (0.004)***
Subsidy		−0.005 (0.005)		−0.020 (0.004)***		−0.014 (0.007)**
Rice, 1998 – 1999						
Income		0.040 (0.005)***		0.049 (0.005)***		0.044 (0.010)***
Distance		0.024 (0.002)***		0.031 (0.003)***		0.033 (0.005)***
Distribution costs		0.001 (0.006)		0.010 (0.006)		0.006 (0.010)
Crime rate		−0.043 (0.006)***		−0.044 (0.006)***		−0.045 (0.008)***
Crime power	—	−0.003 (0.007)	—	0.004 (0.007)	—	0.018 (0.010)*
Infrastructure		−0.137 (0.014)***		−0.127 (0.015)***		−0.139 (0.023)***
Regional shipping		−0.002 (0.002)		−0.003 (0.002)		−0.006 (0.003)*
Price regulation		0.001 (0.003)		0.001 (0.003)		0.020 (0.005)***
Subsidy		−0.035 (0.004)***		−0.034 (0.004)***		−0.097 (0.036)***

Continued from p.82

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Vermicelli, 1998 – 1999						
Income		0.170 (0.006)***		0.121 (0.006)***		0.098 (0.009)***
Distance		0.047 (0.003)***		0.017 (0.003)***		−0.017 (0.005)***
Distribution costs		0.156 (0.007)***		0.108 (0.007)***		0.054 (0.009)***
Crime rate		−0.064 (0.007)***		−0.037 (0.007)***		−0.065 (0.008)***
Crime power	—	0.085 (0.007)***	—	0.057 (0.007)***	—	0.003 (0.009)
Infrastructure		−0.080 (0.016)***		−0.143 (0.016)***		−0.251 (0.023)***
Freight tariff		0.010 (0.002)***		0.022 (0.002)***		0.011 (0.003)***
Price regulation		−0.023 (0.004)***		−0.009 (0.004)**		−0.009 (0.005)*
Subsidy		−0.017 (0.005)***		0.012 (0.005)**		−0.024 (0.008)***
Butter						
Income	−0.048 (0.009)***	0.097 (0.004)***	−0.088 (0.011)***	0.080 (0.004)***	0.004 (0.012)	0.096 (0.006)***
Distance	0.035 (0.004)***	0.042 (0.002)***	0.024 (0.004)***	0.026 (0.002)***	0.002 (0.006)	0.014 (0.003)***
Distribution costs	0.016 (0.011)	0.063 (0.004)***	0.003 (0.013)	0.046 (0.004)***	0.083 (0.014)***	0.062 (0.006)***
Crime rate	0.123 (0.012)***	−0.011 (0.004)***	0.144 (0.013)***	−0.008 (0.004)*	0.066 (0.012)***	−0.021 (0.006)***
Crime power	0.085 (0.011)***	0.050 (0.005)***	0.085 (0.011)***	0.034 (0.005)***	0.135 (0.013)***	0.050 (0.007)***
Infrastructure	−0.022 (0.025)	−0.020 (0.010)*	−0.063 (0.027)**	−0.039 (0.011)***	−0.040 (0.029)	−0.047 (0.013)***
Freight tariff	0.034 (0.004)***	−0.005 (0.001)***	0.040 (0.004)***	0.000 (0.001)	0.022 (0.003)***	−0.005 (0.002)***

Continued from p.83

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Butter						
Price regulation	−0.006 (0.005)	0.003 (0.002)	−0.012 (0.006)**	0.018 (0.002)***	0.004 (0.006)	0.011 (0.003)***
Subsidy	−0.025 (0.009)***	−0.011 (0.003)***	−0.023 (0.009)**	−0.022 (0.003)***	−0.091 (0.009)***	−0.025 (0.005)***
Boiled sausage						
Income	0.151 (0.006)***		0.047 (0.005)***		0.041 (0.007)***	
Distance	0.105 (0.003)***		0.063 (0.002)***		0.016 (0.003)***	
Distribution costs	0.115 (0.008)***		0.036 (0.007)***		0.017 (0.008)**	
Crime rate	0.041 (0.006)***		0.077 (0.006)***		0.019 (0.006)***	
Crime power	0.065 (0.006)***	—	0.046 (0.005)***	—	0.017 (0.005)***	—
Infrastructure	−0.046 (0.017)***		−0.072 (0.015)***		−0.094 (0.017)***	
Freight tariff	0.008 (0.002)***		0.029 (0.002)***		0.015 (0.002)***	
Price regulation	−0.011 (0.003)***		0.002 (0.003)		−0.005 (0.003)*	
Subsidy	−0.005 (0.004)		−0.010 (0.004)**		−0.037 (0.004)***	
Vodka						
Income	0.210 (0.007)***		0.135 (0.007)***		0.135 (0.011)***	
Distance	0.072 (0.003)***		0.041 (0.003)***		0.042 (0.005)***	
Distribution costs	0.027 (0.009)***		−0.009 (0.008)		−0.021 (0.013)*	
Crime rate	0.124 (0.008)***		0.138 (0.008)***		0.111 (0.010)***	

Continued from p.84

Variable	All regions		Excluding difficult-to-access regions		European Russia	
	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999	1993 – 1995	1997 – 1999
Vodka						
Crime power	−0.038 (0.007)***	—	−0.054 (0.007)***	—	−0.064 (0.009)***	—
Infrastructure	0.102 (0.018)***		0.060 (0.017)***		0.042 (0.024)*	
Freight tariff	−0.018 (0.003)***		−0.002 (0.002)		−0.003 (0.003)	
Price regulation	0.009 (0.004)**		0.025 (0.004)***		0.018 (0.006)***	
Subsidy	−0.020 (0.005)***		−0.026 (0.005)***		−0.041 (0.007)***	

Crime power — Economic power of crime.

Table G2. Impact of Various Factors on Prices of Individual Industrial Goods.

Variable	All regions	Excluding difficult-to-access regions	European Russia
Men's trousers, 1998 – 1999			
Income	0.155 (0.006)***	0.135 (0.007)***	0.142 (0.010)***
Distance	0.015 (0.003)***	0.003 (0.003)	−0.015 (0.005)***
Distribution costs	0.021 (0.006)***	0.013 (0.007)*	0.028 (0.008)***
Crime rate	−0.001 (0.007)	0.009 (0.007)	−0.042 (0.008)***
Economic power of crime	0.060 (0.008)***	0.040 (0.008)***	0.004 (0.009)
Infrastructure	−0.202 (0.017)***	−0.253 (0.018)***	−0.258 (0.024)***

Continued from p. 85

Variable	All regions	Excluding difficult-to-access regions	European Russia
Men's trousers, 1998 – 1999			
Regional freight tariff	0.005 (0.002)**	0.005 (0.002)*	0.012 (0.003)***
Shuttle trade	0.028 (0.003)***	0.022 (0.003)***	0.006 (0.004)
Subsidy	0.048 (0.005)***	0.036 (0.005)***	−0.013 (0.007)*
Shirts, 1997 – 1999			
Income	0.091 (0.005)***	0.081 (0.006)***	0.072 (0.010)***
Distance	0.044 (0.002)***	0.031 (0.003)***	0.032 (0.005)***
Distribution costs	0.047 (0.006)***	0.028 (0.006)***	0.059 (0.008)***
Crime rate	−0.037 (0.006)***	−0.040 (0.007)***	−0.087 (0.009)***
Economic power of crime	0.127 (0.007)***	0.098 (0.007)***	0.112 (0.010)***
Infrastructure	−0.041 (0.015)***	−0.046 (0.015)***	−0.048 (0.022)**
Regional freight tariff	0.005 (0.002)**	0.004 (0.002)*	−0.009 (0.003)***
Shuttle trade	0.025 (0.002)***	0.021 (0.002)***	0.029 (0.003)***
Subsidy	−0.004 (0.005)	−0.008 (0.005)***	−0.084 (0.007)***
Women's blouses, 1998 – 1999			
Income	0.123 (0.006)***	0.125 (0.007)***	0.134 (0.011)***
Distance	0.003 (0.003)	0.007 (0.003)**	0.002 (0.006)
Distribution costs	0.016 (0.007)**	0.017 (0.007)**	0.021 (0.011)*
Crime rate	0.014 (0.007)*	0.007 (0.008)	−0.018 (0.010)*

Continued from p.86

Variable	All regions	Excluding difficult-to-access regions	European Russia
Women's blouses, 1998 – 1999			
Economic power of crime	0.002 (0.008)	0.000 (0.008)	−0.001 (0.011)
Infrastructure	−0.087 (0.018)***	−0.084 (0.019)***	−0.129 (0.026)***
Regional freight tariff	0.013 (0.003)***	0.011 (0.003)***	−0.003 (0.004)
Shuttle trade	0.009 (0.003)***	0.009 (0.003)***	−0.001 (0.004)
Subsidy	0.016 (0.005)***	0.013 (0.005)**	−0.006 (0.008)
Skirts, 1998 – 1999			
Income	0.157 (0.007)***	0.145 (0.008)***	0.196 (0.013)***
Distance	−0.002 (0.003)	−0.007 (0.004)**	−0.004 (0.007)
Distribution costs	0.037 (0.008)***	0.031 (0.008)***	0.050 (0.012)***
Crime rate	−0.097 (0.008)***	−0.094 (0.009)***	−0.116 (0.011)***
Economic power of crime	0.032 (0.009)***	0.024 (0.010)**	−0.002 (0.013)
Infrastructure	−0.097 (0.020)***	−0.122 (0.021)***	−0.125 (0.031)***
Regional freight tariff	0.016 (0.003)***	0.018 (0.003)***	0.019 (0.005)***
Shuttle trade	0.023 (0.003)***	0.022 (0.003)***	0.004 (0.004)
Subsidy	−0.032 (0.006)***	−0.032 (0.006)***	−0.022 (0.010)***
Jumpers, sweaters, 1997 – 1999			
Income	0.123 (0.005)***	0.115 (0.006)***	0.089 (0.009)***
Distance	0.058 (0.002)***	0.047 (0.003)***	0.015 (0.004)***

Continued from p.87

Variable	All regions	Excluding difficult-to-access regions	European Russia
Jumpers, sweaters, 1997 – 1999			
Distribution costs	0.084 (0.006)***	0.065 (0.006)***	0.081 (0.008)***
Crime rate	−0.027 (0.006)***	−0.036 (0.006)***	−0.070 (0.007)***
Economic power of crime	0.057 (0.007)***	0.036 (0.007)***	0.050 (0.008)***
Infrastructure	−0.012 (0.014)	−0.000 (0.015)	−0.136 (0.020)***
Regional freight tariff	0.010 (0.002)***	0.011 (0.002)***	−0.001 (0.003)
Shuttle trade	0.006 (0.003)**	0.005 (0.003)*	0.002 (0.003)
Subsidy	0.027 (0.004)***	0.026 (0.004)***	−0.019 (0.006)***
Gasoline, 1997 – 1999			
Income	0.063 (0.004)***	0.003 (0.003)	−0.002 (0.005)
Distance	0.047 (0.002)***	0.016 (0.001)***	0.002 (0.002)
Distribution costs	0.061 (0.004)***	0.025 (0.003)***	0.011 (0.004)***
Crime rate	−0.013 (0.004)***	0.014 (0.003)***	0.011 (0.004)**
Economic power of crime	0.035 (0.004)***	0.016 (0.003)***	0.008 (0.004)*
Infrastructure	0.051 (0.009)***	−0.040 (0.008)***	−0.073 (0.011)***
Regional freight tariff	−0.009 (0.001)***	0.002 (0.001)*	−0.001 (0.001)
Shuttle trade	0.015 (0.002)***	0.011 (0.001)***	0.008 (0.002)***
Subsidy	0.006 (0.003)**	0.005 (0.002)**	0.005 (0.003)

Continued from p.88

Variable	All regions	Excluding difficult-to-access regions	European Russia
Children's jackets, 1997			
Income	0.099 (0.008)***	0.090 (0.009)***	0.039 (0.012)***
Distance	0.021 (0.004)***	0.026 (0.004)***	0.011 (0.006)*
Distribution costs	0.006 (0.009)	0.012 (0.010)	0.015 (0.013)
Crime rate	0.026 (0.010)***	0.031 (0.011)***	0.007 (0.012)
Economic power of crime	−0.033 (0.010)***	−0.034 (0.011)***	−0.000 (0.012)
Infrastructure	0.134 (0.021)***	0.116 (0.022)***	0.007 (0.027)
Regional freight tariff	−0.000 (0.003)	0.003 (0.004)	−0.001 (0.004)
Shuttle trade	−0.030 (0.004)***	−0.030 (0.004)***	−0.018 (0.004)***
Subsidy	0.054 (0.007)***	0.047 (0.008)***	−0.018 (0.010)*
Children's boots, 1997			
Income	0.121 (0.007)***	0.099 (0.008)***	−0.004 (0.009)
Distance	0.012 (0.003)***	0.007 (0.003)**	−0.001 (0.006)
Distribution costs	0.117 (0.008)***	0.097 (0.009)***	0.067 (0.010)***
Crime rate	−0.058 (0.008)***	−0.021 (0.008)**	−0.021 (0.009)**
Economic power of crime	0.058 (0.008)***	0.049 (0.008)***	0.074 (0.009)***
Infrastructure	0.136 (0.019)***	0.093 (0.020)***	−0.109 (0.022)***
Regional freight tariff	0.019 (0.003)***	0.023 (0.003)***	0.015 (0.003)***

Continued from p.89

Variable	All regions	Excluding difficult-to-access regions	European Russia
Children's boots, 1997			
Shuttle trade	−0.026 (0.003)***	−0.029 (0.003)***	−0.021 (0.004)***
Subsidy	0.051 (0.006)***	0.049 (0.006)***	−0.004 (0.007)
Filter cigarettes, 1997			
Income	0.025 (0.005)***	0.010 (0.005)*	−0.012 (0.007)*
Distance	0.031 (0.003)***	0.024 (0.003)***	0.006 (0.004)
Distribution costs	0.093 (0.007)***	0.066 (0.007)***	0.067 (0.008)***
Crime rate	−0.049 (0.007)***	−0.033 (0.007)***	−0.053 (0.007)***
Economic power of crime	0.057 (0.007)***	0.045 (0.007)***	0.078 (0.007)***
Infrastructure	0.119 (0.016)***	0.100 (0.016)***	−0.014 (0.017)
Regional freight tariff	0.004 (0.002)*	0.007 (0.002)***	−0.012 (0.003)***
Shuttle trade	−0.019 (0.003)***	−0.022 (0.003)***	−0.031 (0.003)***
Subsidy	−0.028 (0.005)***	−0.029 (0.005)***	−0.018 (0.005)***

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